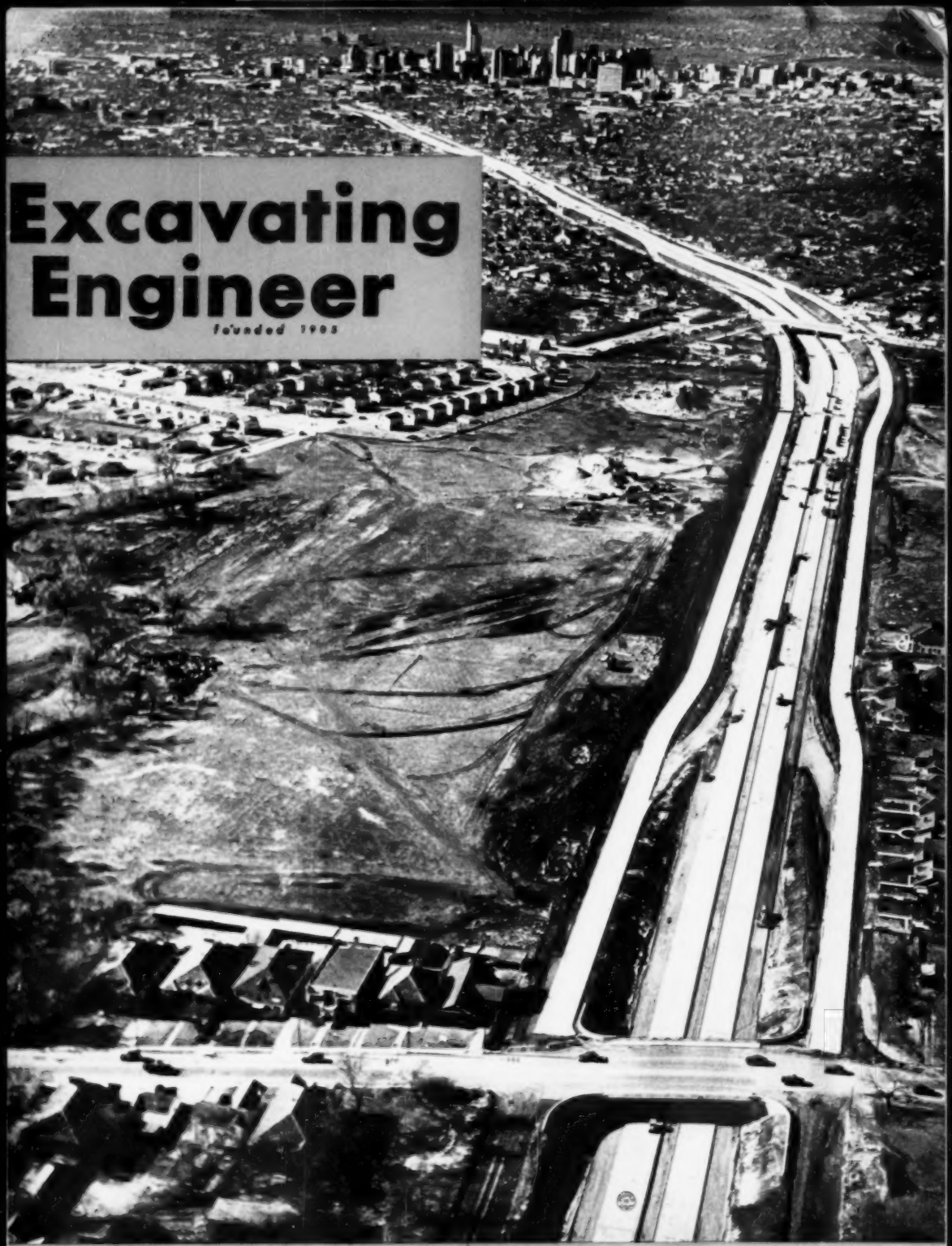
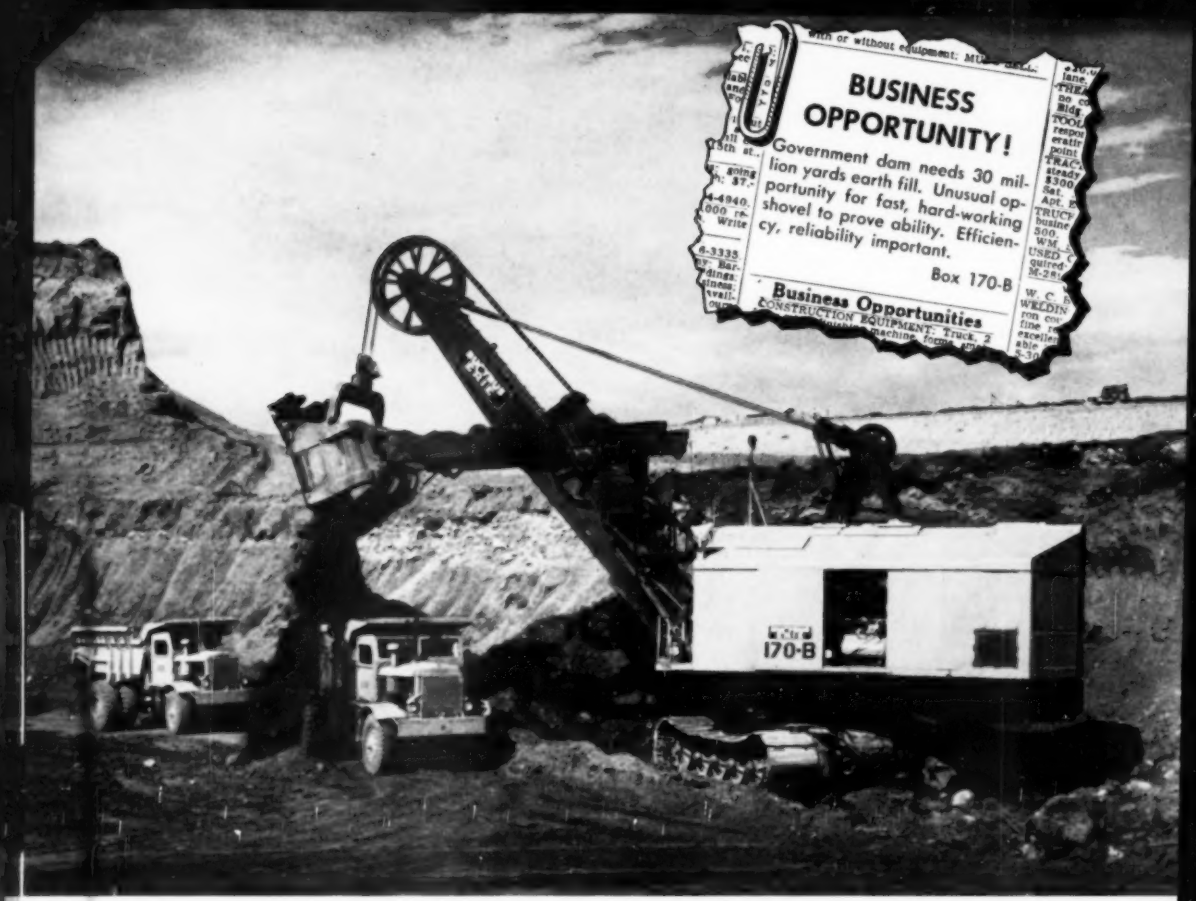
Excavating Engineer

founded 1905



• Aerial view of portion of Dallas' Central Expressway project looks southwest to skyscrapers in downtown section, three miles away. Subbase grading and paving are in progress between Fitzhugh (foreground) and Haskell Avenue passes. See article, page 16.

July, 1949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Government dam needs 30 million yards earth fill. Unusual opportunity for fast, hard-working shovel to prove ability. Efficiency, reliability important.
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Business Opportunities
170-B

OPPORTUNITY *for a Bucyrus-Erie!*

Fort Randall Dam, now building on the Missouri River in South Dakota, will be 10,000' long, 160' high and 1600' wide at its base, containing 30 million cubic yards of earth fill. That's a large order, but far from impossible with machines like this Bucyrus-Erie 170-B shovel, pictured working on the structure.

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66149c

BUCYRUS ERIE

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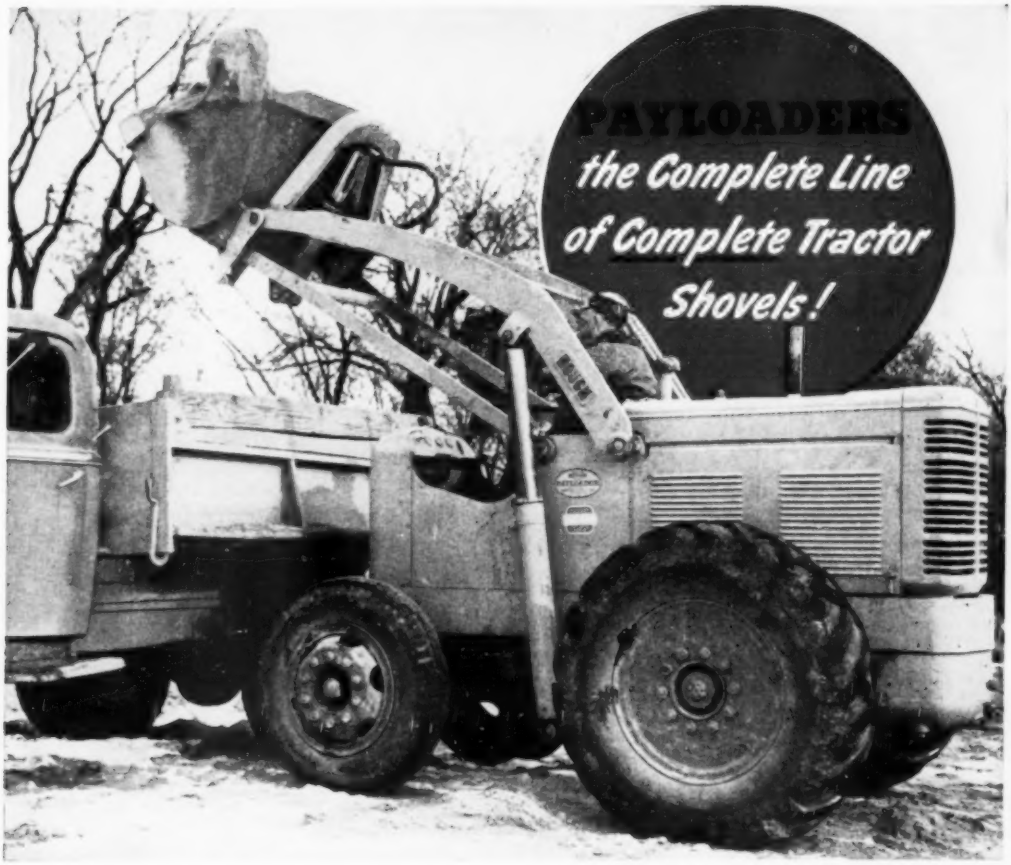

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founded 1905

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Three contractors—George Wimpey and Co., Ltd., Denham, Uxbridge, Sir Robert McAlpine and Sons, Ltd., Glasgow, Scotland, and John Laing and Son, Ltd., Carlisle—are executing a total of $38 million in contracts in the construction of Europe's biggest steel plant for the Steel Co. of Wales, at Margam, South Wales. Boggy marshlands, shifting sand dunes and a lack of adequate access roads lead the list of major handicaps that have been overcome. Fill on the 1,650-acre site totals over four million cu. yd.

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By 1952, the Brazos River in central Texas will be tamed and its restless waters controlled by $40 million Whitney Dam and Reservoir. Right now, L. P. Reed Construction Co., Meridian, Tex., is placing the last half of the over 1½-million cu. yd. of fill required in the 16,065-ft. long earth embankment.

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Cost per Unit of Work is a flexible term, varying with different industries. It can mean the rope cost per yard of rock moved by a power shovel; the rope cost per ton of coal pulled up a hillside; or the rope cost per ton-mile in oil-country drilling. But however you use wire rope, whatever your system of records, you can be sure of this: Bethlehem wire rope means *low* Cost per Unit of Work.

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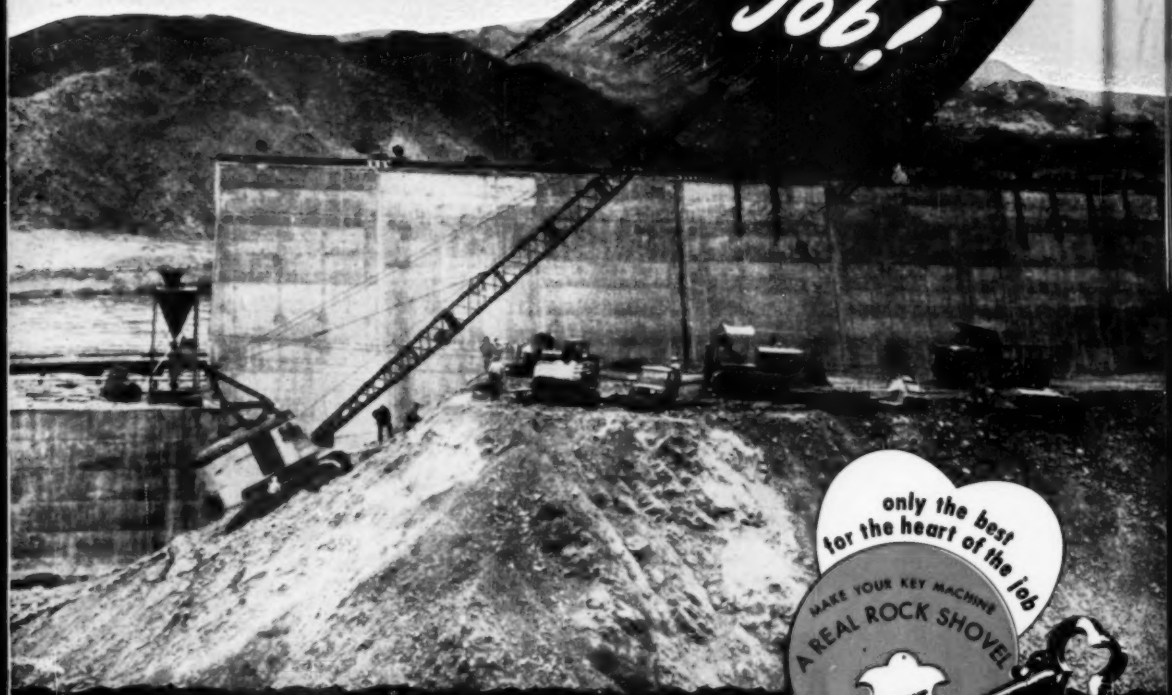

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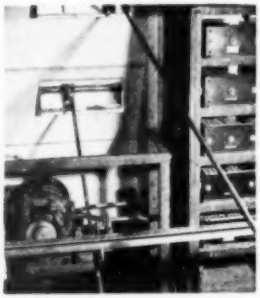
swing and hoist ... Electrically

G-E equipped Colby crane at work on site of Granby Pumping Station

Hoist assembly consists of cable drums and General Electric 100-hp motor

Operator at controls of Colby crane, spotting loaded concrete buckets

Inspection and maintenance of the G-E control equipment is easy



Swing motor and resistor assembly are compact, yet readily accessible

Colby Crane Helps Granby Constructors Shorten Schedule

Here's the "sky hook" that's accelerating concrete placing operations at Granby Pumping Station, heart of the Bureau of Reclamation's Colorado Big Thomson project. The crane is built by Colby Steel and Engineering Company of Seattle and embodies the latest and most efficient electric drive and safety devices.

Machinery manufacturers and contractors alike are realizing the time and money economies of *electrically* driven construction equipment. And by specifying General Electric they get the additional advantages of engineering assistance in application, installation and service wherever the job may be.

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Whether you use or build construction equipment, your G-E representative can show you how to do a better job at lower cost by complete electrification. He will be glad to call on you at your convenience.

Electrified Construction
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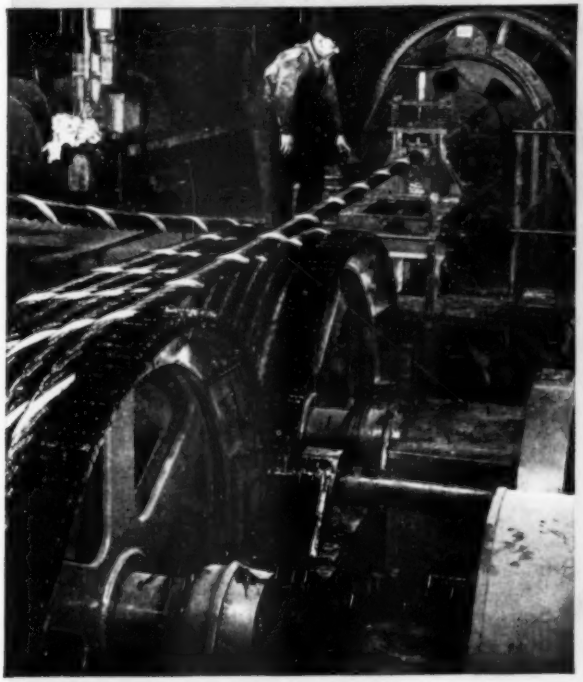
LOWER COST

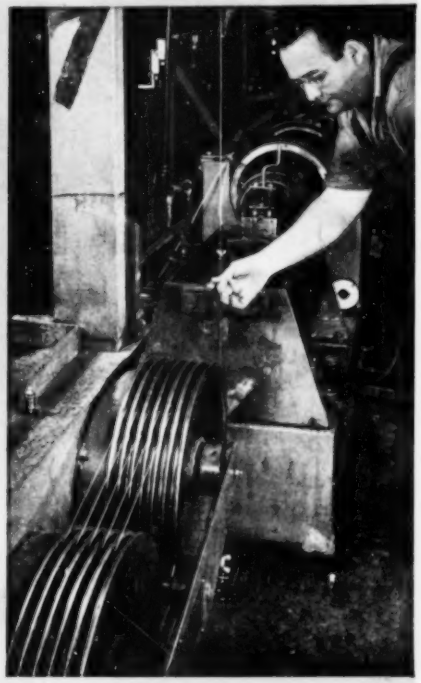
GENERAL ELECTRIC

664-2

This photograph shows a 3⅛" diameter Monarch Whyte Strand Wire Rope coming off a Macwhyte closing machine. Weight of this rope is approximately 16.65 pounds per foot. It has a strength of approximately 392 tons and is used for the digging line on large dragline excavator with 35 cu. yd. bucket.



In this photograph is a 3/64" diameter Stainless Steel Cord coming off a Macwhyte closing machine. It weighs approximately 0.35 lbs. per 100 feet; has a strength of approximately 270 pounds, and is used for many small cord needs.



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For International T-6, TD-6

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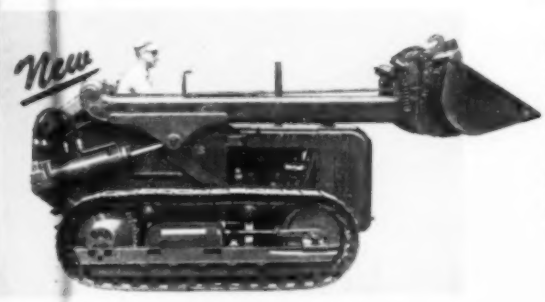
Now, more than ever, it pays to do digging, loading, stockpiling, bulldozing and lift-about jobs the Dozer-Shovel way! The new Bucyrus-Erie Dozer-Shovel, with its long lineup of important new features, has conclusively proved in thorough job tests that it's far ahead of the field in fast, economical performance. It gives you all the advantages of its pace-setting predecessor plus greater speed, greater simplicity, easier operation, and a long list of other significant improvements.

The new Bucyrus-Erie Dozer-Shovel is available with either gravity-dump bucket or hydraulic bucket control. Its method of attachment to International Dozer-Loader tractors relieves the tractor main frame of all superimposed loads. Its new hydraulic control features a single, compact unit that combines pump, valve and oil tanks. Check the features listed and illustrated here — consider what they'll mean in faster, more efficient handling of your jobs. Then see your International Industrial Tractor Distributor for complete details.

BUCYRUS-ERIE CO. South Milwaukee, Wis.

1S1749C



LOWER OVERHEAD CLEARANCE Lack of superstructures gives Dozer-Shovel unusually low overhead clearance. It can go wherever tractor goes . . . work in close quarters.

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◆ *Shovel* ◆ *Bulldozer*
◆ *Lift-About Crane*

See Your **INTERNATIONAL** Industrial Tractor Distributor

On mountain-top mine, rubber strips 25,000 yards

It takes the agility of a mountain goat to set foot on Garfield Chemical Company's new phosphate mine at Diamond Fork Canyon, near Springville, Utah. Here, located at 8,000' altitude, a rubber-tired C Tournadozer climbed along steep, rock-faced slopes . . . shoved 25,000 yards off the mountain top in thirty-five 8-hour shifts.

8' Overburden Dozed an average of 175'

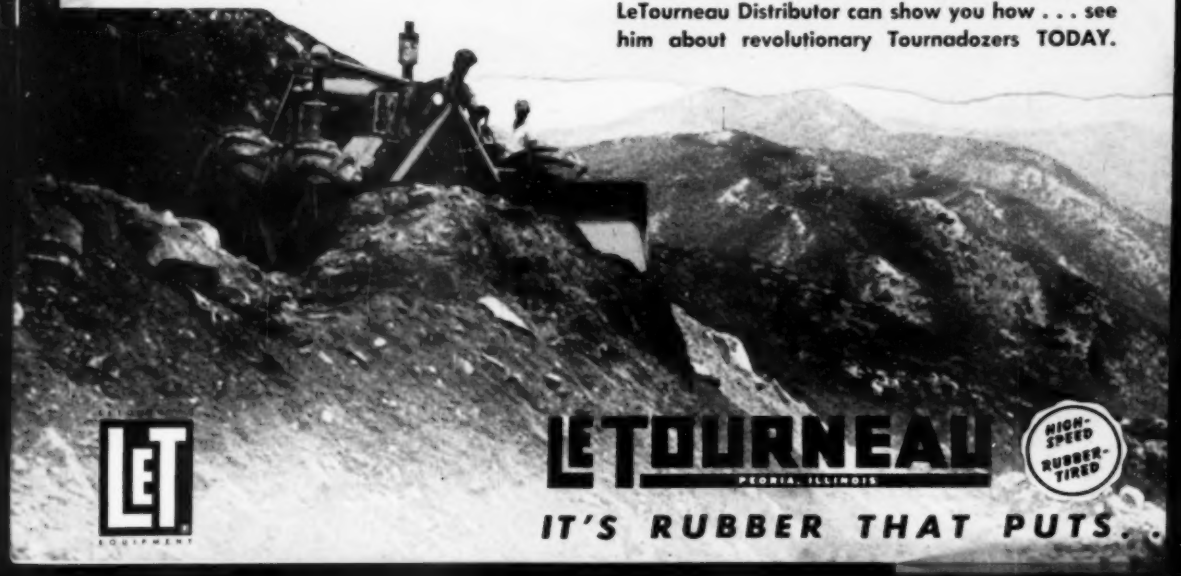
Overburden consisted of an 8-foot layer of heavy clay and imbedded boulders . . . last 18 inches above phosphate was an even tougher, semi-solid material. The entire 25,000 yards had to be moved an average distance of 175 feet. By handling all stripping in 281 work-hours, Tournadozer maintained an overall job average of 89 bank yards an hour. This checks with a time study on a 209-foot one-way shove, which showed the Tournadozer moved 76 bank yards an hour.

Dozed 2½ to 3 yds. each pass

On this work, Tournadozer's 180 "horses" and 4-wheel drive put plenty of power behind the big, rugged, 2½-yard blade to move oversize loads each pass. By dozing in a "slot", to minimize spill off ends of blade, operator often moved as much as 3 cu. yds. per load. Instant, "no-shift" selection of 4 forward speeds saved loss of momentum . . . let operator drift loads in higher gears. Reverse speeds to 15 m.p.h. cut non-productive time on return half of dozing cycle, for more passes per hour. Giant 21.00 x 25, low-pressure tires gave plenty of sure-footed traction on rocky ledges and steep inclines . . . powerful air-actuated brakes on all 4 wheels assured dependable, safe control at all times.

Other mining uses

This fast-working Tournadozer was operated by stripping contractors McFarland and Hullinger of Tooele, Utah, who also used it to sweep up the deposit face . . . and to feed blasted phosphate to loading plant. This same ability to move extra yards per hour . . . and handle extra jobs per year can increase *your* profits, too. Your local LeTourneau Distributor can show you how . . . see him about revolutionary Tournadozers TODAY.



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IT'S RUBBER THAT PUTS . . .

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in 35 eight-hour shifts

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Tournadozer—Trademark

Now! When You Order Forget

Tests Prove Service Life of Tuffy is Greater

"After moving 1,834,000 cu. yds., the superintendent is very pleased with Tuffy Draglines, especially because they are digging back from a very steep slope in a 70 ft. hole under tough abrasive action. On basis of this performance, another set of 2½", 280' Tuffys, a set of 2", 225' Tuffys and a 2¼", 216' and 2⅛", 224' Tuffy for a twin drag machine have been ordered to replace competitive ropes."

"Tuffy Dragline's ruggedness gave well over 300 percent improvement in performance plus considerable time saved changing lines."

From all parts of the country, replies such as these verified the claims made by Union Wire Rope engineering specialists who designed Tuffy Draglines. In-the-field tests were made under severe operating conditions where Tuffy handled many types of material on different equipment. Tuffy's extra flexibility, abrasive resistance and stamina were challenged in digging, casting, and loading operations. Yet results of the tests were the same in all cases: Longer Life, Better Performance, Greater Economy.

Tuffy is a special rope for any and all dragline jobs. It is designed by the same specialists who have made hundreds of other Union Wire Rope products the standard of quality in the construction field.

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DRAGLINES . . .
Everything Except

the NAME Tuffy

the SIZE ?inch

the LENGTH ?feet

Just These 3 Specifications

Tuffy . . . Size . . . Length—that's all you order to get the RIGHT dragline for your particular job. No more confusing specifications, only to end up with a rope that is restricted to use under limited operating conditions. Now—in one simplified order—you get Tuffy Draglines designed to give maximum performance in *all* operations.

Always specify Tuffy when you order. (Example: 225' 1¾" "Tuffy" Dragline). Mail coupon today for illustrated folder.

Tuffy DRAGLINES

are Built Tough to Meet all Operating Conditions

Extra flexibility and maximum abrasive resistance are built into Tuffy Draglines to assure dependable performance on any type of equipment—handling any type of material. Wet and dry dirt, sand, rock, gravel, cement, minerals, all give way to Tuffy's structurally tough construction. At high speeds or low speeds, Tuffy Draglines give top operating efficiency; they hold securely to drum when casting, ride better on grooves and are easier and safer to use. Put Tuffy to the test! He's built tough!

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CITY ..... ZONE .....

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Housing Pays

WHEN Sig Moe, president of Intercity Sand & Gravel Co., Eugene, Ore., bid for the first excavation work on the Springfield Homes housing project last year, he didn't consider it a large operation. He still doesn't. But, as he realized then, it would be a job in his own backyard —less than three miles from his main shops. It would not tie up much heavy equipment nor interfere with larger projects.

The total of his successive contracts on this housing project—contracts for grading and graveling the subdivision streets, contracts for both sewage and water lines, paving the streets, and renting a Bucyrus-Erie 22-B crane for the erection of the houses—has added up to a fair-sized figure, $100,000.

Springfield is a booming, humanity-bulging town across the upper Willamette River from Intercity's shops in Eugene. Logging trucks roar through the main streets, making them hazardous even to a shovel runner. Lumber mills hover over the town's outskirts—including the huge Weyerhaeuser plant (See *Excavating Engineer*, Apr., 1949, "Constructing Calapooya's Sawmill," page 20). Springfield is a town where everyone is too busy cutting lumber to build anything out of it.

$1 Million Project

The new subdivision, a $1,101,600 project, is expected to help alleviate the town's critical housing shortage. It will consist of 136 houses—68 2-bedroom and 68 3-bedroom—built by

- Top: Sling swung from boom of Bucyrus-Erie 22-B crane is secured to pre-assembled dwelling brought to the Springfield Homes project on specially built trailer from Portland, Ore., 85 miles away. Houses are sectioned by rooms, packaged for erection by crane. Two sections are carried on a truck and trailer, two trucks and trailers moving a complete house.

- Center: Crane swings section around, gets it ready for positioning next to sections already placed.

- Left: Workmen guide section to its position on foundation.

Project Off

Intercity Sand and Gravel Co., contracting firm of Eugene, Ore., is fulfilling $100,000 in small contracts covering miscellaneous jobs — street construction, laying of sewage and water pipe, paving, grading — in a subdivision of Springfield, Ore., where 136 pre-assembled homes are nearing completion.

by Tom Riley

● Above: As soon as a section is placed, carpenters slide and "button" it to the adjacent section and to the 2x4 fir foundation plates.

Robert F. Johnson & Associates, Inc., Constructors, Portland, Ore., who owns the subdivision. The Johnson Co., well-known on the Pacific Coast, placed 1,800 pre-assembled houses in 1944 at Richland, Wash. (Hanford Project), and is at present producing four houses a day. The houses are built in four and five 3-dimensional sections (by the room) which are placed together on the site. Exterior siding, flooring, and gabled roof are added as on ordinary construction. The finished Springfield houses will be sold on the open market at a yet undetermined price, somewhere between $8,000 and $9,000, FHA financing.

Intercity Sand & Gravel received its first contract—$24,000—in the housing project last year to grade and gravel subdivision streets throughout the site for C. F. Huser, original owner. Approximately one mile of streets was opened and 18,000 square yards of gravel, six inches thick, were laid. Two International TD-9 dozers with Bucyrus-Erie blades and one Adams 412 grader opened the streets. Stripping consisted of removing only a few inches of topsoil. A TD-18 International tractor pulled a Bucyrus-Erie 9-yd. scraper to remove some excess material, but because the subdivision site is entirely flat farmland, main work was grading.

When the subdivision was sold to Johnson, Intercity received the two excavation contracts for sewage and water lines in the initial work on the housing project itself.

Intercity's bid of $21,000 covered

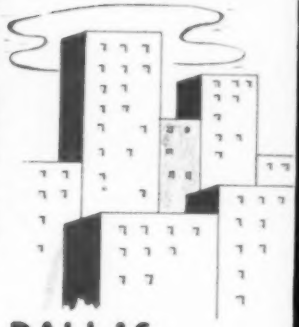
Continued on page 46

Texas Expr

How our "fastest growing state" is solving its most pressing problem—traffic congestion in four principal cities.

• **Above: With Dallas skyscrapers in background, Northwest 104 dragline with 1¼-yd. Hendrix bucket digs 6½-ft. deep storm sewer trench on stretch that will one day be an expressway.**

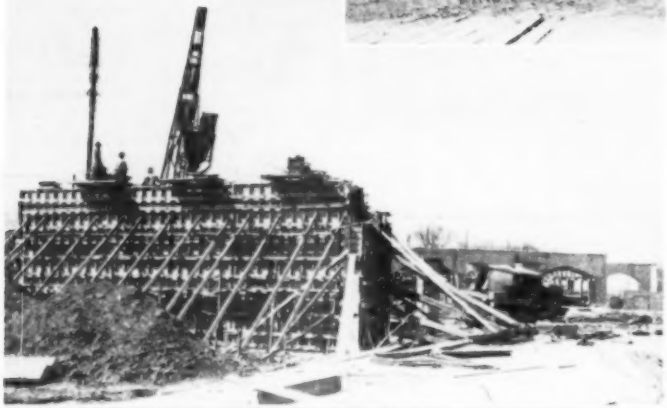
• **Right: This 4-ft. embankment of the Houston & Texas Central Railroad provided much of the right-of-way. Built in 1870, the line—first into Dallas—was used until tracks were removed in 1947.**



DALLAS

THE economic life of Texan cities is based on the agricultural wealth and mineral resources of surrounding areas. And by the same token the people of Texas and neighboring states look to large cities such as Dallas and Houston as focal points offering means of livelihood and cultural advantages.

But like other cities over the nation, Dallas, Fort Worth, San Antonio and Houston are faced with serious transportation-traffic problems. Conveniences of city life have long been extended to rural and suburban districts. The automobile has enlarged greatly the area in which city dwellers may live. And by this very fact, the number of automobiles which converge on the central sections of cities has been vastly increased.



• **Above: A 1-yd. concrete bucket is swung from White-mounted Jaeger mixer (right) to 30-in. abutment form by P & H 300-A crane during pouring operations at overpass.**

• **Right: Workmen dig utilities alongside overpass abutment. A 200-cfm Gardner-Denver Compressor powers pavement breakers and airspades.**

essways

In many respects, Texas has been more progressive in facing these problems than most states. Long ago, the Texas Highway Department realized that the traffic pattern of the inner city of the future—if it was to keep pace with the outlying sections—had to undergo some changes.

Dallas' Solution

Expressway development in Texas is best exemplified by the Dallas Central Expressway project, a dream of Dallas city planners for more than 20 years. The unusual project extends 10.1 miles across the city. It stretches through the populous residential areas of South Dallas, by the edge of the downtown and commercial section, through the residential sections of North Dallas, along the boundaries of Highland Park and University Park, and on to the Northwest Highway. The latter is part of Loop 12, by-passing Dallas on the north and leading to Fort Worth, 35 miles to the west.

The project will not only relieve traffic congestion in Dallas but will also furnish an essential link to U. S. 75 which extends from Winnipeg, Canada, to the Gulf of Mexico. The future continuous expressway will greatly accelerate through movement of vehicles.

Traffic studies show that by existing streets it is 11 miles through the city from the Trinity River on the south to the Northwest Highway, and that it requires 37 minutes in traveling time. The continuous Central Expressway of 10.1 miles, based on 50 mph on the expressway and 20 mph on the boule-

• Top: Overpass on Houston expressway has three lanes (each way) divided by 6-in. black iron oxide bands worked into concrete just before it sets up.

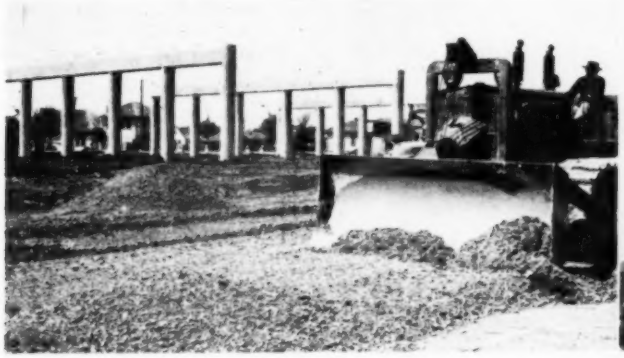
• Above: Cat D7-drawn rollers and Caterpillar 12 grader compact and levels one of three 14-in. lifts to 100% Proctor specification. Surfacing material on this temporary road is 2-in. shell dredged from Galveston Bay, barged in, washed and mixed with 25% sand in pug mill.

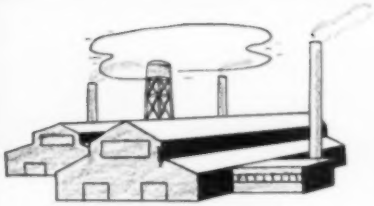
• Right: Cat-drawn LeTourneau scraper places top dirt on railway overpass fill.

• Right: Bucyrus-Erie 54-B crane positions steel beams for overpass south of Houston.

• Below: Service road near railway overpass is spread with shell by International TD-24 tractor with Bucyrus-Erie bulldozer.

HOUSTON





FORT WORTH

• Above: Along Fort Worth expressway, a ¾-yd. Lima dragline puts down culvert excavation.

• Left: These men are in charge of Fort Worth expressway planning: (left to right) Floyd Smith, designing engineer, roadways; F. E. Lovett, supervising urban engineer, and A. M. Gordon, supervising designing engineer, bridges.

• Below: Lima 45 crane handles 1-yd. concrete bucket at culvert pouring operations.

• Above: Rock outcrop is drilled with Worthington wagon drill powered by Worthington 305 compressor. Holes here were put down on 4½-ft. centers and fired 56 at a time.

• Left: A 2-yd. Lorain loads Caterpillar DW-10 wagon. Haul was 5,000 feet to waste area. Cat D8 with LeTourneau dozer dresses side slope.

vard portions, will clip 18 minutes off the present time. Time saved along various sections of the project will range from 49 to 68%.

The Central Expressway is backed by the Federal Aid Highway Act of 1944. This act, in addition to providing the usual funds for construction of Federal Aid Highways, also provides funds for aiding the states in the construction of urban expressways through larger cities.

Follows Railroad Right-of-Way

Following pasage of this act, plans were prepared which provided for construction of 6.23 miles of the project as an expressway. Thus, the project as initially constructed will be of both the boulevard and expressway type, and will fit into a future continuous expressway pattern. This will entail a 200-ft. minimum width right-of-way with no traffic lights, no intersections at grade, opposing traffic streams separated, and with entry and exit limited to selected points. Cross traffic will be provided for at reasonable intervals either over or under the expressway.

For many years the stumbling block to this vast undertaking was acquiring the right-of-way. The logical approach was a unique one—acquire the railroad right-of-way which bisected the city. Most important links in this plan were rights-of-way belonging to the old Houston & Texas Central, first railroad to reach Dallas 75 years ago, and the Texas & New Orleans Railroad.

Ten years ago the city took formal steps to acquire the railroads' rights-of-way. Cost was a dominant question. Finally in the years between 1944-46, agreements were reached with the four different railroads affected. Early in Aug., 1947, agreement on all points was concluded and a spirited ceremony initiated removal of the old H & TC tracks from the north section of Dallas.

Officials estimate the overall cost

will approach $18 million, this cost to be about equally divided between the city, state and Federal governments. Five different contractors already are busy on the project. Largest contract to date was awarded to Texas Bitulithic Co. of Dallas. This $1,034,000 contract covers grading, structures and paving 1.2 miles of the North Expressway section. This work is under the supervision of J. J. West, Texas Bitulithic superintendent.

Another award for $955,500 is in the combined hands of the Austin Bridge Co. and the Austin Road Co., both of Dallas. This contract, covering .9 mile of the North Expressway, includes grading, structures and paving. Austin Bridge also has completed a $275,000 contract for the Hall Street overpass. M. W. Grumbles for Austin Bridge and T. J. Insall for Austin Road are the superintendents.

In conjunction with the roadway work, McKenzie Construction Co. of San Antonio and Dallas has completed a $423,500 contract for a 4,254-ft. storm sewer underneath the North Expressway right-of-way. An estimated $800,000 contract awarded by the City of Dallas to extend the sewer tunnel another 7,000 feet was completed last January.

Bore Drainage Tunnel

Starting in the summer of 1947, C. F. Coke, general foreman, and his crew of sand hogs smashed steadily ahead into a wall of solid rock, 50 feet below the surface. The horseshoe-shaped tunnel, 12 feet wide at floor level and 9 ft. 7 in. high in the center, was dug from three main shafts, with two 10-hour shifts each day.

Progress was made at the rate of 48 feet a day, including drilling, blasting, loading, hoisting the rock to the surface, and hauling to a waste area. Following closely behind at the surface was a force-feed concrete pump to line the walls of the tunnel. This job was in

Continued on page 49

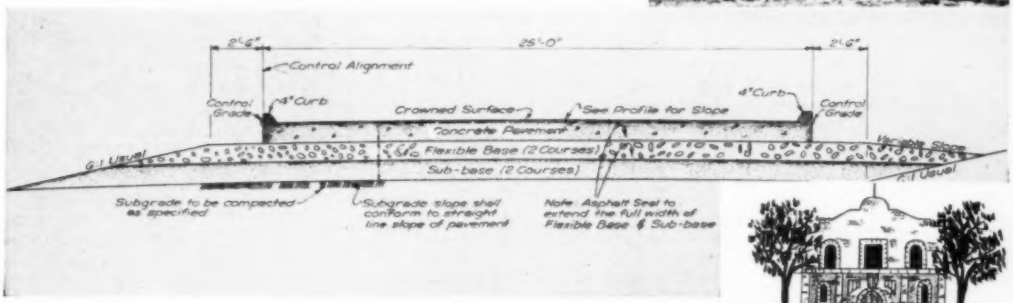
• Above: Workmen use Thor air tools to compact approach fill under 90-ft., 2-span bridge of continuous concrete girder design. Because of poor soil conditions, 36-in. 50-ft. free supports for bridge pass through abutment footings to blue shale.

• Right: At a San Antonio field office are (left to right) R. H. Ziegler, R. O. Lytton, and H. G. Bossy, all supervising engineers for expressway work.

• Above: Spoil material from 20,000-cu. yd. R.R. cut is spread on private land by Cat-drawn 15-yd. Gar Wood scraper, levelled by Caterpillar 12 grader and compacted by Cat-drawn Ingram 48-in. rollers.

• Right: At R.R. cut, ¾-yd. Koehring 401 shovel loads Ford truck.

• Below: Drawing shows typical cross section for San Antonio expressway. Flexible base was required because of undesirable subsoil condition.



SAN ANTONIO

Modernizin

• Top: Weeds growing in canals and drainage ditches go up in smoke as burning fuel oil is sprayed from appartus mounted on Ford truck.

• Above: Prefabricated steel form made in District yard is filled with concrete. These forms can be set (by crane) and concrete poured on same day.

• Right: A section of drainage pipe is lowered into position by Bucyrus-Erie 29-B crane.

Recent trend in mechanizing California's 500,000-acre Imperial Irrigation District has been away from specialized machines in favor of modern draglines used in conjunction with "chemical warfare." A fleet of ½- to 1½-yd. draglines does everything from canal and drain excavation to crane work — setting forms and pouring concrete for check and drop structures.

By Robert J. Green

FROM the standpoint of the population it serves, the Imperial Irrigation District in southern California's Imperial Valley is one of the most important ventures of its kind in the world today. Its 500,000 acres raise food for nearly three million people.

The story of the Imperial Irrigation District up to 1940 was a thrilling history of pioneering and the slow but stubborn growth of the organization and the people of the valley. But the story from 1940 on has implications just as important. In these later years the District has been modernized. Newer methods have been developed to keep pace with modernized agricultural practices.

In the past few years, for example, 1,500 miles of farm tile drains have been constructed. Sixty miles of main drains are being built each year. Concrete drop structures, formerly built laboriously by hand, are now rushed to completion in two days, using permanent re-usable steel forms built at District headquarters. New chemicals are being used to kill weeds and vegetation at a saving in cost, replacing older, more expensive methods.

The modernized irrigation program proposes for each 160-acre plot of ground a tie-in to a permanent drain 7.5 feet deep, 3 feet wide on the bottom, with 1¼:1 side slopes. These drains form a huge part of the present earthmoving program of the District. Construction of these drains, however, is an expenditure of money separate from the maintenance of the irrigation system and construction work on canals.

New Farming Practices

Present day earthmoving and construction practices are aimed as a solution to improved farming practices developed over the years. Today, the fertile soils of the Imperial Valley will yield two crops of slow-growing carrots per year, for example, and up to five cuttings of alfalfa. The valley is productive throughout the year, because it has a 12-month growing season.

Accelerated farming demands more water. The water applied to crops by the District's irrigation system, which in turn takes its supply from the All-American Canal, augments the too-scarce 3-in. normal rainfall of the valley. A big drainage system, now totalling 1,300 miles, takes excess water away to either the Alamo or New River.

Soils of the valley, made up mostly of silt and sand, are free from hardpan and go down to great depths. In the first days of the reclamation operations —the early 1900's—drainage of the area under irrigation was not thought necessary. But District engineers have found that drainage is required for the

g Imperial Irrigation

entire area although the lands needing it are not continuous. Drainage removes seepage from canals and excess water applied during irrigation which cannot get away because of the tightness of the soil. High alkali content also necessitates drainage.

Potentially irrigable lands in the East and West Mesas, bordering the present irrigation district, are also about to be developed in response to public demand. Two experimental farms have been developed by the District in East Mesa, using water from the All-American Canal. Development of these acres will call for construction of additional lateral canals. As the situation now stands, the excavating equipment of the District has enough work ahead for all of 1949 and part of 1950, working six days a week throughout the year.

A specific example of what is meant by modern accelerated farming with careful irrigation and adequate drainage was demonstrated by a farmer who planted 1,160 acres in carrots. Within five months this crop was harvested, hitting a short market to the tune of a gross return of $1,500 per acre! Carrots were then replanted *one day* after the other crop harvest was finished. The second crop hit the same kind of market, at the same profit. A green manure crop of legumes was then planted, to be plowed under, all within a year.

Farmers don't always hit the market that well, but it's the District's job to keep the water flowing and drainage facilities operating so they can try.

Drain Construction Methods

A fleet of 15 modern draglines, all built by the Bucyrus-Erie Co., is being used throughout the District. The group includes one 38-B, one 21-B, two 22-B's, two 20-B's, two 18-B's, one 17-B, and six 15-B's. These machines do everything from drain canal excavation to crane work, setting heavy structures in place. The smaller machines have been indispensable in cleaning and deepening work, as well as for the installation of pipes for drains.

Dispatching of all machinery is handled from the District's main yard in the Town of Imperial. All moves from one job to another are made by a fleet of International, White and Autocar trucks, with low bed trailers. Six of these machines are used, and none of the draglines ever walks from one job to another, as they did in former days. Whether the move is a mile or 35 miles, a truck is used to hasten the operation in order to keep all draglines on productive digging as many hours as possible.

• The District developed this drill rig for investigation work. Mounted on a set of Athey tracks, it consists of a Sullivan air compressor, a set of leads, and the drill itself. Dodge Power Wagon behind rig brings in material and supplies over the rough terrain.

A crew for a dragline consists of an operator and a swamper, or oiler. This crew also operates out of the Imperial yard, on a portal-to-portal pay basis. About an hour before starting time, yard men get each crew's pickup truck ready to go out. Fuel drums for the dragline are filled. The grease and oil supply is replenished. When the crew shows up at 7:30 AM all it has to do is get into the pickup truck and drive off, because everything is ready to go.

The trip out to their machine varies from a mile to a maximum of approximately 35 miles. By the time the men fuel the machine, lubricate and service it, the better part of an hour has gone by. Actual excavating time for a dragline averages between 6 and 6.5 hours per shift, depending on the distance from the yard.

Use Lime Markers

An excellent trick has been developed recently in the excavation of drain canals to speed up the work, and to make a better looking ditch. The use of lime markers between survey hubs is the stunt which has brought this about.

A survey party, operating ahead of the machines, first stakes the drain ditches by installing cut stakes at the side slope lines at intervals of 40 to

• North of the Calexico-Yuma Highway (background) a ½-yd. Bucyrus-Erie 15-B dragline cleans one of the smaller drainage ditches.

50 feet, or closer if the ground is uneven. Since it is not easy to interpolate the line between these stakes, an anonymous swamper hit on the idea of marking the slope lines with lime. Stretching a tight string between the hubs as a guide, he sprinkled a small amount of lime lightly on top of the string. The string was then moved on ahead, leaving a clear, plain line to work by.

It has been variously estimated that this trick alone has boosted output by from 10 to 20% per day. The drain ditches are not large, and a machine must do precise work with its bucket in almost all the digging cycles it makes in a move.

Excavate Corners First

The corners are first excavated, using a great deal of care to get the side slopes true. The slopes are dressed while digging is done by sliding the bucket down the slope toward the block of dirt always lower in the drain ditch. After the sides are dug, the center chunk of material is dug out. It is only in the top portion of this center cut that the machine can normally dig without too much regard for line and grade.

Many of the District operators are old-timers. The lime trick helps a new man to dig like a veteran in a short time. A 22-B dragline will account for from 200 to 250 lineal feet of completed drain ditch in its 6-hour digging day with regularity.

Still another trick is now being used to reduce the leakage from lateral canals. Sides and bottoms are sometimes sealed by spraying on 24-gravity fuel oil through a small pressure tip.

Shallow, lighter ditch work is being handled very nicely by the smaller Bucyrus-Erie machines, particularly the ½-yd. 15-B's. This work consists mostly of cleaning the older 4.5-ft. deep main ditches and installing small structures and lateral canals. The machines also remove the weeds and tules at the same time.

Machines Do Crane Work

Doubling as cranes, some of the machines also make lifts in the routine servicing and repair of structures. There are 6,400 lateral canal structures in the southern half of the District alone—and this includes only the lateral system. That will give some idea of the magnitude of the job.

Perhaps the most modernized use of all for the excavating machines is the placing of concrete check and drop structures. A machine often moves in early one morning using a clamshell bucket to dig out the footings for the concrete forms. That same day a trailer arrives on the job, carrying three sections of 12-gauge steel forms for the concrete work. Three sizes of these forms have been fabricated, the longest of which is 18 feet by 9 high.

The machine unloads the forms, sets them in place, and the special form bolts which act as tie rods as well as spreaders are put in. The concrete pour is then made the same day. The second day the machine strips the forms, loads them out to the trailer which always stays with the forms, and the equipment is ready for the next job. Backfill is placed with a dragline bucket.

Several interesting variations have been made possible with the prefabricated steel forms. By widening out the centers of the outside forms, and using several center training pier forms, a structure wider than standard is possible. One long structure was lengthened to approximately 50 feet simply by making the pours in three parts. The upstream and downstream pours were made first and second, respectively. Then the straight portion of the steel form was used in the center for the fill-in. The finished work was nicely done, and the forms were still available without alteration for dozens of standard pours later on.

The large forms weigh 5½ tons assembled, the others weigh 4¼ and 5 tons. They all make a similar structure. The first pour builds the training walls and the center pier. These are then tied together by a prefabricated concrete top piece, placed after the forms are stripped by the same excavating machine which excavated for the footings.

• Left: This shopmade "moss plow" was developed to open up the bottom of drain ditches clogged and choked by moss. The rig is guided by two men and towed by tractor (on right bank).

• Below: Chemical warfare has supplanted the moss plow. Here two men apply chemicals, introduced to irrigation water under pressure. Note how quickly moss has disappeared from water behind men.

Weed Control Methods

When the Imperial Irrigation District took over operation of the system in 1922, weeds were about as important a problem as they are today. Because of the 12-month growing season, there is no such thing as weeds dying naturally. Unless they are controlled by some artificial method, they keep on growing until they throttle off the flow of water through the ditches.

In the early days, large 25-man labor gangs were employed. But this was

slow and expensive. Then heavy discs were made up, to be pulled by tractor. This method was cheaper, and was used for several years. This in turn gave way to some weed control with draglines and a now obsolete continuous bucket excavator. Weed burning was developed to a high degree of efficiency just prior to World War II. Continuous burning would even now control weeds over the whole distribution system, but burning is now being aided by the new weed killing chemical hormone killers.

The 2,4-D chemical is being applied to typical weed growths at the rate of six pounds per acre, mixed in a water solution. Several spray rigs have been developed for that purpose. They consist of a truck, flexible hose, spray nozzles, a small compressor and a Wisconsin gas engine. The chemical weed killer, sprayed on the weeds, causes deterioration of the root system.

One of the worst natural enemies of irrigation in recent years has been moss in the canal bottoms. With the introduction of relatively silt-free water from the All-American Canal, moss became much more of a problem than it had ever been before. It was not at all uncommon for moss to clog and choke a canal.

Several solutions have been tried. The best and cheapest, where it could be done, was to turn off the water and dry up a canal. The sun soon killed the moss. However, where water was needed urgently, this was impractical.

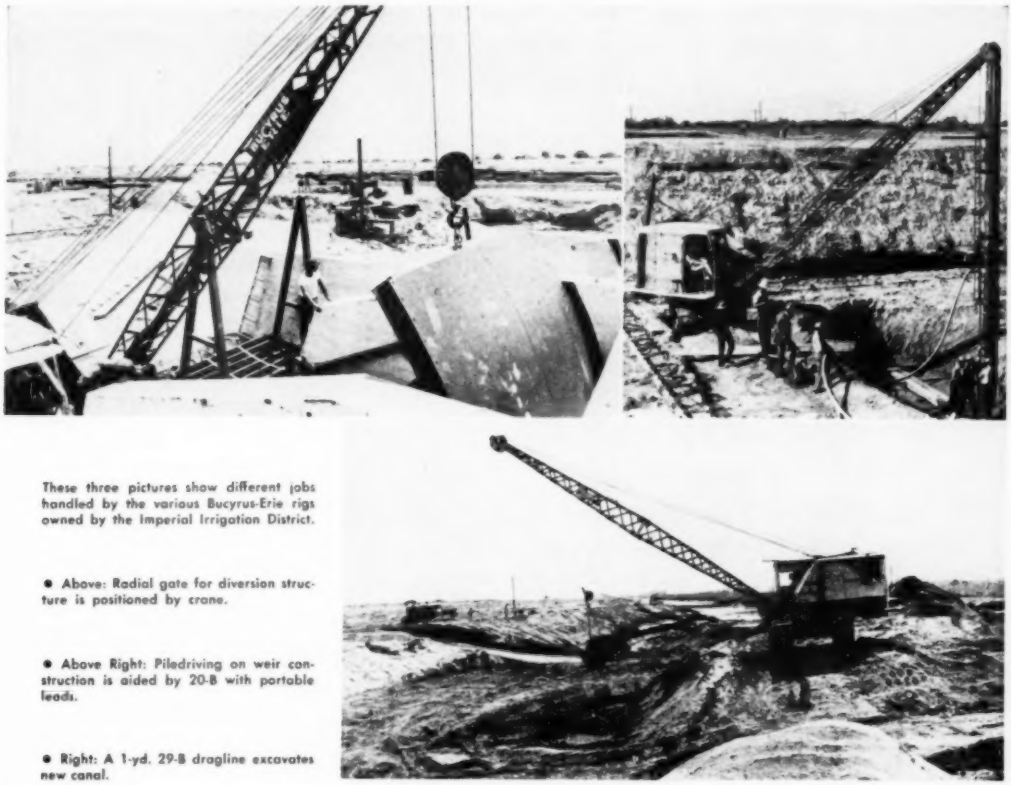
A steel plow was then developed in the Imperial shop, as illustrated in one of the photographs. This "moss plow" was drawn by a tractor, and opened up a channel. It worked very well, within its limitations. But it has recently been supplanted to a great extent by more chemical warfare.

Success with "Chemical Warfare"

A chemical called SoCal No. 2 and SoCal No. 3, developed by Standard Oil Co. of California, is now being used with excellent success for the eradication of moss. Mixed 50-50 with a 5% solution of petroleum sulphonate, the chemical is introduced to irrigation water under pressure. It emulsifies when it mixes with water, and rids the stream of moss as if by magic.

Out in the Imperial yard, two mixing tanks have been installed to prepare the two chemicals. A small storage tank holds the petroleum sulphonate, which is added to the SoCal chemical in the large mixing tank. Approximately 1,200 gallons can be mixed at one time. This solution is then put up in drums and stored until applied. It is quite convenient to haul the chemical out to the ditches in these 50-gal. drums.

Today, irrigation in the Imperial Valley is a bigger business than ever, and twice as important as it was 20 years ago. The land, the water supply and the underground water table are in better shape than ever before. The modernized combination of mechanical and chemical methods is now being employed in the earth moving and construction work of the District as well as on the farms of the Imperial Valley, to insure a full breadbasket for the future to this important segment of the American nation.



These three pictures show different jobs handled by the various Bucyrus-Erie rigs owned by the Imperial Irrigation District.

- Above: Radial gate for diversion structure is positioned by crane.
- Above Right: Piledriving on weir construction is aided by 20-B with portable leads.
- Right: A 1-yd. 29-B dragline excavates new canal.

From Sandspit to Steel

by Arthur E. Jones

Three contractors — George Wimpey and Co., Ltd., Denham, Uxbridge, Sir Robert McAlpine and Sons, Ltd., Glasgow, Scotland, and John Laing and Son, Ltd., Carlisle — are executing a total of $38 million in contracts in the construction of Europe's biggest steel plant for the Steel Co. of Wales, at Margam, South Wales. Boggy marshlands, shifting sand dunes and a lack of adequate access roads lead the list of major handicaps that have been overcome. Fill on the 1,650-acre site totals over four million cu. yd.

ANYONE standing on the high ground of Stormy Downs, an old RAF camp near Margam, South Wales, now taken over by the Steel Co. of Wales, Ltd., can look down across Swansea Bay and see stretches of sand dunes and marshlands slowly being transformed into a new steelworks for the United Kingdom. When the experts chose this site for the $300 million plant, they knew it was not ideal from an engineering standpoint. But close to this 1,650 acres of land are the essentials for steel production —docks and raw materials, a reservoir of skilled steel workers. So, despite

the many major engineering problems involved in erecting a steel plant on marshy land, three contracts, totalling $38 million, have been let, and work is well underway.

Construction of the new plant on the site of an old abbey near Margam represents the largest single effort in the British Isles to increase much-needed steel production—a necessary factor in Britain's chances for industrial recovery. Production of steel in 1948 in the British Isles was just over 15 million tons. The demand for steel as a substitute for timber, the need of steel materials for export engineering plants, the requirements of the vast investment program planned by the United Kingdom mean that production must be increased to more than 17 million tons within the next two years. Pig iron production must be stepped up from 7⅕ million to 9⅖ million tons.

When the steelworks now under construction at Margam is completed and in final production some time next year, the plant will produce a million tons of pig iron and over 1½ million tons of steel ingots every year— the largest output in Europe. The scheme was devised by the Steel Co. of Wales, and approved by the government—the impending nationalization of the steel industry makes no difference to the progress of the project.

• Left: This aerial view shows the northern portion of the site. Foundations for new mills are in foreground while the office buildings can be seen at far left. In upper righthand corner is 18-in. discharge pipe which carries dredged sand and water. Sand predominates in the area.

works

Present Steel Plant

The present steel plant belonging to the same company is about two miles away at Abbey Works, near Port Talbot. It will later form an integral part of the new steelworks. While production goes ahead at a record-breaking pace in its small-capacity field, the old steelworks is also undergoing improvement. Right now it produces a few thousand tons a week, only a very small proportion of the total output of the final plant.

The first contract, valued at $25 million, was let in early 1947 to George Wimpey and Co., Ltd., Denham, Uxbridge. His contract covers the main preparatory excavation and foundation work. About nine months later Sir Robert McAlpine and Sons, Ltd., Glasgow, Scotland, was given an $8 million contract to work at the present steel plant. In the fall of last year another contract for about $5 million was let to John Laing and Son, Ltd., Carlisle, mainly for excavation work.

Wimpey began work at the site in Apr., 1947, with three years to fulfill the requirements of his contract. They include a million cu. yd. of slag fill, 1,600,000 cu. yd. of excavated sand fill, 1,460,000 cu. yd. of pumped sand fill, 260,000 cu. yd. reinforced concrete in foundations, drains, culverts, etc., 17,200 tons of steel reinforcement, 7,800 lineal feet of cable tunnels, 13,000 lineal feet of deep drainage, 10,400 lineal feet of box culverts, 16,000 lineal feet of temporary drainage, 72,000 lineal yards of railroad track, and 25,000 piles. To carry out the contract Wimpey had to drain the entire area, build adequate access roads and site highways, fill in the site, and prevent future sand encroachment.

Boggy marshlands greeted the first workmen who arrived. Within the confines of the area two large lakes and innumerable small streams brought water from the mountains immediately behind the site. Water level was at the surface in winter, about two feet below in summer. A river flowing through the territory was kept from flooding the area by a dike. Drainage of water entering by the many streams and springs was accomplished by a pumphouse on the dike. The pumps had failed once—and the land was quickly covered with seven feet of water.

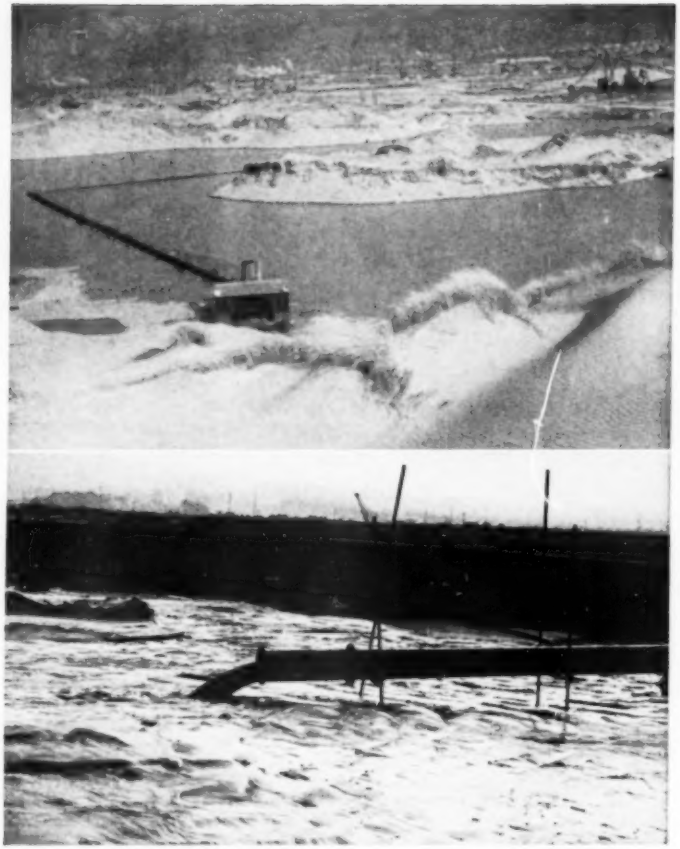
Drainage First Big Problem

Consequently, drainage was one of the first big problems to be taken care of. The lakes and streams had to be removed before any heavy machinery could be moved in or any construction work begun. Wimpey brought in about 100 centrifugal pumps—of Sykes, Miller, Blackstone, Consolidated Pneumatic Tool, and Ransome and Rapier makes—to drain the area. Water went via the pumphouse into the sea.

Four ⅜-yd. Ruston-Bucyrus 10-RB's and two 1½-yd. 33-RB's, rigged as shovels and draglines, were put to work cutting open ditching to drain

• Below Left: Two 1¼-yd. Ruston-Bucyrus 33-RB shovels load sand from dunes three times their height to 5-ton Fordson trucks. Sand is used for fill and also mixed with slag to construct access roads. On other side of these dunes lies the Bristol Channel.

• Below Right: Here reinforcing is prepared ahead of pouring of concrete for soaking pit floor. A total of 17,200 tons of reinforcing steel is required in the Wimpey contract.



the ground, prior to laying culverts. Altogether 16,000 feet of piped and rubble-filled open ditching were put down—one of the first major tasks completed.

Solve Difficult Access Problem

Another problem brought about by the character of the area was suitable access to the site. Present work is being carried out in an area of some 550 acres. On one side is the sea, preventing access there; on the inland edge runs a railroad with only a narrow bridge connecting the main highway to the site. The bridge had been used only by a local farmer to drive his cattle to graze on the marshlands. It was useless as an entrance and exit for the fleet of trucks and heavy construction equipment which sped to the area as soon as the contract was signed.

Wartime experiences came to the rescue, however. As a temporary measure a Bailey bridge was thrown over the railroad close to the original bridge. It served the purpose while a new bridge and wide access roads were being constructed.

Material close at hand made possible the quick construction of highways on the site itself. Sand from the dunes was mixed with slag from old dumps nearby, built up over the years by the Port Talbot plant. To extract the slag from the solidified mass, blasting was necessary before loading could begin.

Current tippings are also used. As

• Top: This lagoon was constructed close to sand dunes to launch Gwynne dredge which pumps through 6,000 feet of pipeline to sections requiring fill. Solid sand placement averages about 250 cu. yd. an hour.

• Above: Sand and water mixture discharges into an enclosed area in the northern section. Maximum sand density is 17%. Altogether 1½ million cu. yd. of sand fill are required — dredging operations are scheduled to wind up this summer.

• Below Left: A Bailey bridge was thrown over railroad close to stone bridge which was the only existing access to site from main highway. The old bridge was useless for carrying heavy construction equipment. Here the Bailey is being dismantled.

• Below Right: One of the first jobs tackled by Wimpey was construction of a permanent access bridge, built some distance from the Bailey. A Rapier crane lowers trestle girder into position during building operations.

• Ransome and Rapier centrifugal pumps dewater trench while Fordson trucks feed concrete to forms during construction of one of the culverts. By the time the job is finished, box culverts will stretch over 10,400 feet of the area.

• Fordson trucks travel on access roads at different levels along slag bank on way to and from slag loading locations. This view looks from the River Ffrwdwyllt which has since been enclosed in concrete and diverted under steelworks into sea.

the molten mass is dumped, it is sprayed with water from jets stretching along the length of the bank. The sudden change in temperature causes the slag to fracture easily. Once it has cooled, the slag can be tackled by a 1½-yd. Ruston-Bucyrus 37-RB shovel without preliminary blasting.

By this system, the excavators break up and load the material to 15-yd. Euclid trucks which haul the material to the access roads.

A million cu. yd. of slag and 1,600,000 cu. yd. of sand are required for fill in the area. The sand dunes, which are a potential menace to the steel plant, have been turned to advantage to form one of the basic materials for concrete and raising the level of the land.

Original level was 10 feet above sea level. Sand is being utilized for bulk filling with a top covering of slag (varying from 9 to 12 inches thick) to raise the level to 20.5 feet. Some 800,000 cu. yd. of slag and 850,000 of sand have already been utilized for fill.

Slag Loading Operations

At peak periods, six Ruston-Bucyrus shovels load at the slag dumps—two 1½-yd. 37-RB's, two 1¼-yd. 33-RB's, a ⅞-yd. 24-RB, and ¾-yd. 20-RB—as well as a ⅝-yd. 19-RB dragline and a ¾-yd. 20-RB dragline. At the same time sand loading is accomplished by a 2-yd. 20-RB, four ⅝-yd. 19-RB's, a ¾-yd. 20-RB and a ½-yd. Ruston 4, all shovels, and a 4-yd. Lima 1201 dragline. Eleven 15-yd. Euclid bottom dump trucks and seven rear dumps are among the over 150 trucks which carry the slag and sand to the fill areas. Most of the others are 5-ton International and Fordson rear dumps.

Two D-8 and four D-4 Caterpillars with LeTourneau dozers and five International TD-9's, also with LeTourneau dozers, do fill and utility work. A 2½-ton and two 10-ton rollers help compact road fills. The biggest single shifter of sand on the site is a 16-in. hydraulic dredge.

The overall raising of the site level would have been the most desirable if foundation work had not been in progress at the same time. The normal working on the foundations was from north to south. In the southern area excavation and foundation work is low,

Continued on page 51

• Within a few yards of sea, sheet piling for sea outfall chamber is driven. An Ingersoll-Rand compressor operates McKiernan-Terry piling hammer swung from a Link-Belt Speeder crane.

• A ¾-yd. Ruston-Bucyrus 20-RB and a Rapier, both draglines, carry through on desilting operations at one of the two large lakes drained at the site.

Sa

• One of the two American revolving cranes at Whitney Dam is ready to pick up 4-yd. Blaw-Knox concrete buckets to deposit concrete in forms, here waiting for pouring work to begin. Structure in the background is the Johnson mixing plant which turns out up to 240 cu. yd. every hour.

WHAT was once a sleepy valley in central Texas is today alive with the activity of construction men busy on the $15,985,317 contract held by L. P. Reed Construction Co., Meridian, Tex., from the Corps of Engineers for completion of the earthwork on Whitney Dam and Reservoir and erection of the concrete spillway section. Destined to harness the waters of the often turbulent Brazos River, the dam is being built about 38 miles above Waco, Tex., at an estimated cost of $40 million.

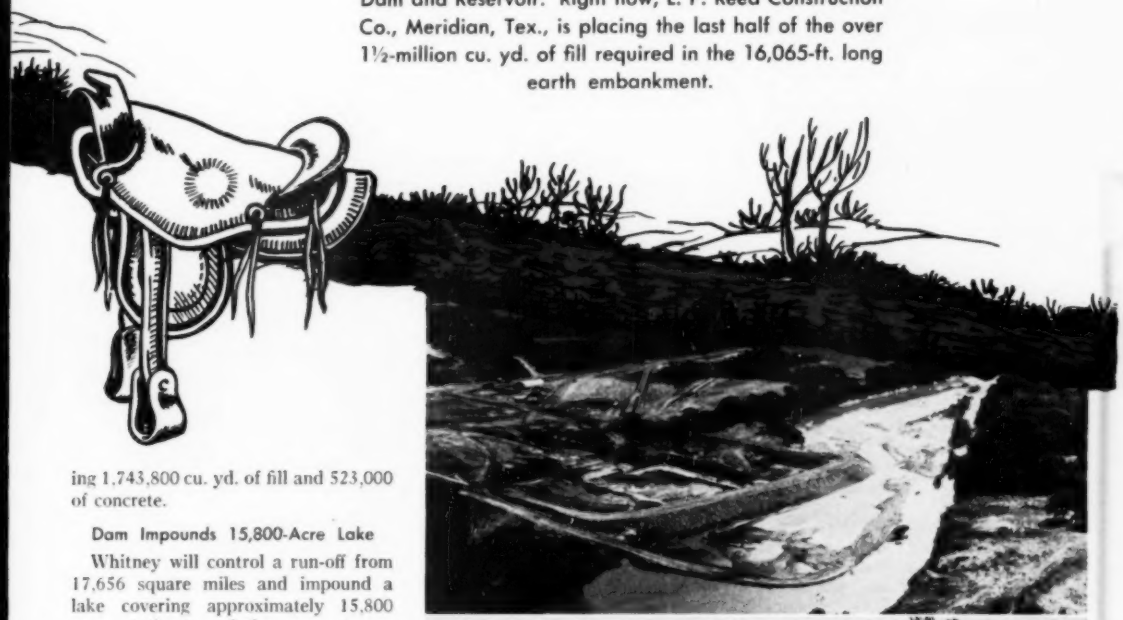
Whitney Dam and reservoir will be a multiple-purpose project — it will control floods; its power plant will generate hydroelectric power, badly needed in Texas; and it will store water for various uses. Of its total storage capacity of 2,017,500 acre-feet, 1,630,500 will be reserved for flood control, 131,700 for power storage and 255,300 for dead storage.

The dam itself will be of concrete gravity construction, flanked on both ends by compacted earth embankments. The concrete section of the dam will be 1,674 feet long, while the earth embankment will stretch to 16,065 feet with a maximum width of 650 feet. The concrete structure reaches 163 feet above the stream bed at its highest point. Altogether the job involves plac-

• Aggregates come by rail from Carbon, Tex., and are fed to stockpiles by this system of conveyors close to the mixing plant. A Caterpillar dozer clears debris in the foreground. Clamshell-crane is a 3-yd. Marion M-93.

ddling the Brazos

By 1952, the Brazos River in central Texas will be tamed and its restless waters controlled by $40 million Whitney Dam and Reservoir. Right now, L. P. Reed Construction Co., Meridian, Tex., is placing the last half of the over 1½-million cu. yd. of fill required in the 16,065-ft. long earth embankment.



ing 1,743,800 cu. yd. of fill and 523,000 of concrete.

Dam Impounds 15,800-Acre Lake

Whitney will control a run-off from 17,656 square miles and impound a lake covering approximately 15,800 acres at the top of the power storage pool, elevation 520 feet. At flood control level, elevation 571, the reservoir will cover an area of 49,710 acres.

Since Mar., 1948, Reed has completed about 50% of the earthwork under his contract, constructed a first stage cofferdam, and excavated to grade the area where the first concrete was placed. His contract calls for 1,143,000 cu. yd. of fill.

The first 600,000 cu. yd. of fill were completed by the Standard Paving Co., Tulsa, Okla., in Apr., 1948. Standard held the first contract let —amounting to $288,915—for the first portion of the earth embankment.

Four Super "C" Tournapulls and

Continued on page 55

• **Right Above: To protect the work area from floods and highwater while the outlet works were under construction, this cofferdam was thrown up on the left bank of the Brazos.**

• **Right: LeTourneau wagons haul concrete in Blaw-Knox buckets from the mixing plant to the pouring operations. Each of the two revolving cranes has a reach of 125 feet.**

Equipment You Ought to Know About

Heavy-Duty Trucks

Manufacturer: General Motors Corp., GMC Truck & Coach Div., Pontiac, Mich.

Claims: All-new heavy-duty truck models—61 basic gasoline and diesel models in the "H" line—will have gross vehicle weights ranging from 19,000 to 75,000 pounds, and gross combination weights up to more than 90,000 pounds for off-the-highway vehicles.

The 640 series with a 177-hp engine and the 740 series with a 190 hp engine or the 4-71 diesel power plant have been added to the "H" line to meet the requirements of certain specialized hauling operations. New gas and diesel 6-wheelers have gross vehicle weight ratings ranging from 38,000 to 75,000 pounds. For operators in states with short-length limitations, the 900 series has been designed with distance from bumper to back of cab shortened by approximately 1½ feet.

Heavy-duty grilles include an inbuilt spring steel bumper guard, at top and sides, for radiator and front-end protection. Grilles are angle-braced to the chassis frame. Fenders are of heavy-gauge steel, which can be removed to permit accessibility to engine.

The new line features five new gasoline engines providing gasoline power for models up to now only diesel. Cubic-inch piston displacement designations are 318, 360, 426, 503 and 707, and they develop 136, 150, 177, 190 and 225 hp respectively.

The diesel line highlights improved 4-47 and 6-71 GM diesels which develop 135 and 200 hp respectively. Compression ratios of both 4-71 and 6-71 diesel engines have been stepped up to 17:1, tractor-type air cleaners have been installed, and air compressors are supercharged.

The chassis have deep, stiff frame side rails, an additional front crossmember, and "alligator" type rear crossmember.

All models have wide-track front axles. Heavier models allow easy removal of shackles from stub shafts instead of frame-spanning shackle bars. There are eight basic rear axle designs.

Cabs are all-steel welded units, attached to the frame by rubber-cushioned mountings, have doors with metal-framed safety glass and windshields with base-mounted dual wipers. They are insulated and sealed against heat and cold, and soundproofed to reduce engine noise. A built-in ventilation system draws in a controlled amount of outside air and forces out used air.

(Illustrated: Four different cabs and front-end designs of 61 basic heavy-duty models just described. First model, left, is representative of the 900-980 gasoline and diesel series; second, 700-890 gasoline and diesel series; third, covers the entire cab-over-engine series, models 520-850; fourth, the 520-650 conventional series.)

Diesel-Electric Shovel

Manufacturer: Harnischfeger Corp., Large Excavator Div., 4400 W. National Ave., Milwaukee 14, Wis.

Claims: The new 4- to 4½-yd. P&H 1400-DE shovel has a heavy-duty, slow-speed diesel engine which powers crowd and swing generator sets. Connected to the diesel engine by a heavy-duty, multiple "V" belt, the generator set with alternator is designed specifically for shovel service with a swing and crowd generator mounted in one frame. A constant duty, low-voltage alternator provides steady power for "Magnetron" control, blowers, lights, etc.

P&H's "Magnetorque" hoist drive eliminates hoist generator, hoist motor, slip friction clutches and other mechanical devices involved in the hoist train. The cushioning characteristic of the "Magnetorque" drive, combined with that of the electrical power system of the crowd and swing, relieves the diesel engine of severe "pull down" in speed.

Gasoline Engine

Manufacturer: International Harvester Co., 180 N. Michigan Ave., Chicago, Ill.

Claims: The 16-hp International U-1

is a new 4-cylinder gasoline engine for a wide range of "cub-horsepower" application. Stripped, the U-1 delivers a maximum of 16.3 brake hp at 2500 rpm. It develops a maximum of 16 working hp equipped with fan, radiator and air cleaner. Overall dimensions of the engine are: 26 13/32 inches, length; 16 11/32 inches, width; 25 inches, height. The engine itself weighs approximately 280 pounds; the complete power unit, 450.

The engine is suitable for powering fans or blowers, generators, portable in-plant or outdoor units, and other installations. It is available as a stripped engine or with job-engineered attachments up to a complete power unit, and can be equipped to operate either on gasoline or natural gas.

Electrodes

Manufacturer: Hobart Bros. Co., Troy, Ohio.

Claims: Electrodes, Hobart 313 and 384 are now being made. The 313 is a Class E-6013 electrode, designed for making short, intermittent welds at

Continued on page 34

At Last! A WIRE ROPE HANDBOOK FOR THE MAN ON THE JOB!

It's new . . . It's different . . . It's easy to understand

J&L STEEL

POCKET SIZE

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3

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From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(tri-ionic steels).*

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A Glutton for Punishment, powered by a diesel engine with matchless lugging ability and stamina—this is the tractor for you to use on heavy, back-breaking jobs. The International Crawler, with broad-gauge stability, balance and geared-to-the-ground traction, is the worker you need.

• Its powerful engine takes tough work in stride, with increased torque for heavier lugging when the load demands it. All-weather starting, advanced-design combustion, full pressure lubrication and other features make it *your obvious choice* among tractors! Compare the operating features and work capacity of the International with any other . . . and you'll insist on an International every time!

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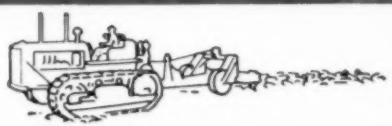

An International TD-14 Diesel Crawler puts these rocks in their place with its hydraulic blade while pioneering a roadway. An all-around workhorse on construction jobs of every kind—a landscape grader, basement excavator as well as versatile road builder—equally useful with blade, ripper or scraper—it will pay its way wherever you put it to work. For full information about this and the 6-cylinder TD-18, write for TD-14 and TD-18 folders.

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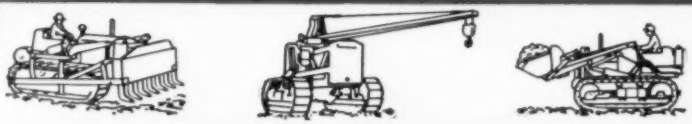


New Equipment

Continued from page 30

high speed on all gauges of steel in any position using either AC or DC, straight or reverse polarity. It has a forceful spray type arc that can be easily started and restarted without scraping or hitting the electrode against the work surface. This electrode will not stick to the work piece. It is available in 12-in. lengths in $^{3}/_{32}$-in. size only and 14-in. lengths in $^{1}/_{8}$-, $^{5}/_{32}$- and $^{3}/_{16}$-in. sizes. Packed in standard containers of 50 pounds each, except the $^{3}/_{32}$-inch which is 25 pounds.

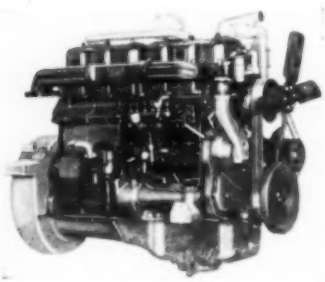
The 384 is a Class E-6020 electrode, designed for making high speed tack welds on heavy weldments without the necessity of breaking the excess coating from the end of the electrode each time the arc is started or restarted. In most cases a mere touching of the end of electrode to the work piece is sufficient to restart and maintain the arc. The coating has sufficient dielectric strength to withstand scraping against the work piece or ground without arcing through.

This electrode is available in 14-in. lengths in $^{1}/_{8}$-, $^{5}/_{32}$, $^{3}/_{16}$-in. sizes and 18-in. lengths in $^{1}/_{4}$-in. size, packed in standard containers of 50 pounds each.

Diesel Truck Engines

Manufacturer: Mack Trucks, Inc., New York, N. Y.

Claims: Three new diesel engines End 672 (illustrated) 510 and 457 are designed and built for Mack trucks exclusively. Operating on the 4-stroke cycle, these engines provide controlled combustion and maintain low peak pressures. The combustion chamber design produces high turbulence which results in thorough and complete combustion to exert a sustained pressure and produce a smooth piston thrust.



Rate of combustion is controlled, avoiding hammer-blow effect on pistons.

Variable and automatic injection timing is synchronized to the speed of the engine by Mack's Synchrovance. By this device injection is timed for the right amount of advance for each speed.

A close-coupled fuel injection pump, rigidly mounted on the block equalizes injection of fuel to all cylinders. Operating on direct drive from the timing gearing, the pump can be removed without upsetting the timing of the engine.

These three engines have been designed specifically for the tractor-trailer combination, 40,000 pounds, gross combination weight.

Off-the-Road Tire

Manufacturer: Pennsylvania Rubber Co., Penn-Craft Park, Jeannette, Pa.

Claims: The Rock Lug Logger, a new truck tire, is designed for off-the-road operations such as strip mining, quarrying, and construction work. This self-cleaning tire has heavy, chip-proof, S-curved lugs. The Rock Lug Logger is available in all popular sizes for off-the road vehicles.

Scraper

Manufacturer: Wooldridge Mfg. Co., Sunnyvale, Calif.

Claims: Model TC-142 tractor-drawn-scraper has capacities of 14.2 cu. yd. struck and 17.5 heaped. It features a 3-piece cutting edge, 65-in. front apron opening and curved bowl ejector.

Overall height with blade on ground is 10 ft. 9 in.; overall width, 11 ft. 6 in.; overall length, with pusher, 35 ft. 2 in.; wheel base, 21 feet; internal bowl width, 10 feet; blade clearance and depth of spread, with four 21.00-x24 tires, 16 inches; optional alternate tire arrangements with six 18.00x24 tires or two 21.00x24 tires front and two 24.00x29 tires rear. Approximate weight is 28,400 pounds.

Lantern Stand

Manufacturer: Pucel Enterprises, Inc., 3746 Kelley Ave., Cleveland 14, Ohio.

Claims: The lightweight, non-corroding lantern Saf-T-Stand has a heavy gauge steel platform, approximately 4x7 inches long with three upright reinforced welded steel clamps of spring-locking type to grip the lantern base firmly and keep the lantern upright. On each of the 4-in. sides of the

platform is a 13-in. long rigid vertical steel rod. Each rod is adjustable to three positions—vertical, 45° angle, and horizontal. The overall height of the stand is approximately 19 inches and the overall width is approximately 10 inches. The entire support is finished in a corrosion-resistant aluminum finish.

To facilitate attachment to a wood barricade, the rods are equipped with inflexible L-shaped 1-in. steel brackets. Each bracket is positioned on each rod by a positive located dimple. When the Saf-T-Stand is set on a wood barricade, the rods lend support on one side, and the brackets on the other side. The brackets can be attached to the barricade by nails, screws, or bolts.

The stand can be used advantageously by road repair crews, county and state highway departments and contractors.

Blasting Fuse Cap

Manufacturer: Western Cartridge Co., Division of Olin Industries, Inc., East Alton, Ill.

Claims: Two years of storage in an atmosphere of 85% relative humidity had no appreciable effect on the new Big Inch RDX-loaded aluminum blasting fuse cap, it was revealed after a sand bomb test. In the test two glass graduates contained approximately the same amount of crushed sand despite the fact that the one contained sand crushed by a new Big Inch cap, and the other sand crushed by a Big Inch which had just been taken from two years of storage. In the sand bomb test, an extremely insensitive explosive is wadded around a blasting cap buried in sand within a heavy steel case. When the charge is detonated, the sand in the

bomb is screened through a 30-mesh screen to separate the crushed sand from the unaffected portion.

Truck Crane and Carrier

Manufacturer: Northwest Engineering Co., 135 S. LaSalle St., Chicago, Ill.

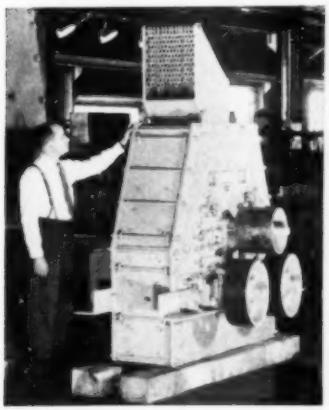
Claims: A new truck crane and carrier combination is now being made. The crane has a capacity of 20 tons. The minimum boom length for crane work is 30 feet; boom is extendible to 100-foot length by addition of standard intermediate sections. Main operating machinery of the crane is mounted on cast steel side frames. All high-speed shafts are mounted on ball or roller bearings. "Feather-Touch" clutch control, uniform pressure swing clutches, and a high-speed, power-controlled independent boom hoist are standard equipment.

The carrier has a box-type truck frame reinforced the full length of the carrier. Outriggers extend the full width of the carrier. The forward outrigger is positioned close to the rear wheels to relieve the carrier of a greater amount of stress. The rear outrigger trunk is demountable and makes possible changing from crane to shovel, dragline or pullshovel work without repositioning the lower base for the crane.

Small Impact Breaker

Manufacturer: New Holland Mfg. Co., Mountville, Pa.

Claims: A new double impeller impact breaker Model 1212, is designed for secondary crushing and small gravel installations. The 1212 will handle ma-



terial passing a 12-in. square opening. It is designed to produce crushed aggregate as fine as minus one inch in a recirculating system. It is the smallest breaker made by Holland to produce crushed stone by impact in suspension.

The 1212 differs from bigger models in size and in the use of rotor rolls in the two impellers instead of 4-cornered impeller bars. Use of rotor rolls in the impellers provides even-wearing breaking surfaces since the rolls automatically rotate when the breaker is in action.

Weight of the 1212 is 7,900 pounds. It has an inlet feed opening of 12¾ x12⅛ inches. Outlet discharge opening is 15⅜x66¼ inches.

Bearings are self-aligning, heavy-duty, anti-friction type. Either flat belt or V-belt drive can be used. Individual drives can be rigged to each rotor assembly or a single wrap drive can be used with idler pulley.

Dragline Buckets

Manufacturer: Pettibone-Mulliken Corp., 4700 W. Division St., Chicago, Ill.

Claims: A series of featherweight perforated dragline buckets are from 20% to 40% lighter in their capacity

range. These buckets are of welded construction with 14% manganese steel for the lip and socket point type teeth, sheave, wire rope sockets and dump chain links. They are available in sizes from ⅜- to 2-cu. yd. capacities.

AC Welder

Manufacturer: Eutectic Welding Alloys Corp., 40 Worth St., New York, N. Y.

Claims: Eutecarc AC welder is a standard 200-volt machine featuring stepless control for adjustment of current. It is possible to weld on light and heavy-gauge materials with this machine.

The welder is mounted on casters, making the machine mobile. Overall dimensions are 17x17x32 inches.

It provides accurate stepless heat control over the entire welding range. Its amperage selector control of current allows selection of very small amounts of current, ranging from 20 amperes to 285 amperes. It accommodates electrodes from 1/16 to ¼-in. diameter.

Supercharged Gas Engine

Manufacturer: The Cooper-Bessemer Corp., Mt. Vernon, Ohio, and Grove City, Pa.

Claims: A supercharged 4-cycle gas engine is said to increase power output 80% while cutting fuel consumption by one-third. Without need for pilot fuel, the 4-cycle, spark-ignited gas engine attains efficiencies equal to or exceeding the best performance of gas-diesels.

Where conventional spark-ignited gas engines operate on a fuel input of 9,500 to 10,000 BTU per hp hour, the new engine requires less than 7,000 BTU. By achieving an increase in brake-mean-effective pressure from the normal 70 to 125 psi the new engine is able to produce an 80% power increase over ordinary gas engines with the same piston displacement according to claims.

The new-type engine requires no increase in cooling equipment because total heat developed is no greater than with old-style engines, despite the increase in power.

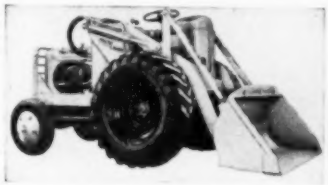
The new design can be easily converted to either gas-diesel or fuel oil-burning diesel operation. Test conversions were made in from one to two hours.

Regular production is scheduled to get under way before the end of the year.

Tractor Loader

Manufacturer: Tractomotive Corp., Deerfield, Ill.

Claims: The TL-W Tracto-Loader has ½ cu. yd. standard bucket, is mounted on rubber tires and has the bucket over the driving wheels and the steering wheels in the rear. The TL-W's short overall length is 12 feet with bucket down; width is 4 ft. 9 in. (outside tire measurements). The bucket picks up its load through forward crowding action and an automatic "tilt-back" feature. The bucket is hydraulically operated and positively



controlled. It can be dumped in part or all at once and will load average dump trucks.

Other features are 1-piece, seamless steel tubings and hydraulic hose lines with detachable and re-usable fittings.

Over a Million

The Euclid Loader delivered an average of 775 cu. yds. into hauling units every hour throughout this high-speed job.

Steep, smooth sides of the improved hopper and full length and width door opening shed the big loads fast in even windrows on the fill.

EUCLIDS

Yards in 60 Days!

A Euclid Loader and 6 improved Bottom-Dump Euclids teamed up to move most of the 1,256,000 cu. yds, of earth for Colorado City Dam in Texas. Contractor Harry Campbell of Ft. Worth completed the job in only 60 working days!

The dam is 4,500 ft. long and 74 ft. high, with a main earth embankment 1,600 ft. in length. It will furnish water for a steam generating plant of Texas Electric Service Company and a municipal supply for Colorado City.

At the peak of operations the Loader, "Eucs," and other hauling units attained hourly production of over 950 cu. yds., averaging 775 cu. yds. per hour for the entire job. Powered by diesel engines of 190 h.p., the Bottom-Dump "Eucs" maintained high speeds with capacity loads on the 3,200-ft. haul. The 24.00 x 25 tires on drive and trailer wheels provided excellent traction and flotation on the fill.

Operators on the job liked the comfortable form-fitting seat, mounted on a hydraulic shock absorber and adjustable for weight and position. The Euclid air booster steer reduced driver effort on turns and gave positive control at all times. An improved hopper design shed the big, 16-yd. loads fast in even windrows for easy spreading and compaction — saved time on every trip.

Ability of "Eucs" and the Loader to stay on the job day after day and move dirt faster kept this rush project in high gear and enabled the contractor to complete Colorado City Dam on schedule. Write today for literature on the improved Bottom-Dump and other new models.

THE EUCLID ROAD MACHINERY CO.
CLEVELAND 17, OHIO
CABLE ADDRESS . . . YUKLID

Good haul roads enabled the "Euca" to travel at high speed with capacity loads. Top speed of this Euclid model with full payload is 34.4 miles per hour.

Move the Earth

News from the Field

Road Fund Shortages Concern ARBA Men

The inadequacy of present highways for increased traffic and the necessity of stepped-up construction in the coming years were the themes of addresses delivered at the 3-day convention of the Southeastern States conference sponsored by the ARBA in Savannah, Ga.

Expenditures of $47 billion over a 10-year period at a rate double that of the dollar-record 1948 pace will be required to enable America's deficient roads to meet the nation's highway transportation needs, J. S. Bright, head of the PRA Department of Construction and Maintenance told the group. His estimate was based on statewide highway surveys made at the request of state legislatures or the executive departments of state governments.

Results from 17 states in which surveys were completed show that 579,010 miles, or 49% of the 1,172,785 miles of highways appraised, are deficient.

"If this pattern holds true in the remainder of the 48 states," Bright said, "the estimated cost of correcting all the highway deficiencies over a period of 10 years would be at least $47 billion."

Deficiencies, as reported in the survey, show that 55% of state highway mileage, 49% of county and local mileage and 41% of city streets need immediate and considerable attention.

Maintenance expenditures on state, county and municipal highways rose from $393 million in 1921 to $1 1/10 billion in 1948 according to the PRA official. In support of his statement that the 1948 rate of construction and maintenance should be at least doubled to keep up with the growing traffic increases over the highways, Bright pointed out that of the total $30 billion highway transportation bill last year, only about 1/10 went for highways. The rest went into automobiles, insurance premiums, gasoline, parking, lubrication, tires and all the other products of private industry.

Motor Registrations Rise

Other figures quoted by Bright show that motor vehicle registrations rose from 10½ million in 1921 to 40½ million in 1948, and from 55 billion vehicle-miles to 395 billion vehicle-miles in the same period. Converting passenger and commercial vehicle-miles travelled into ton-miles and relating it to annual construction expenditures, Bright asserted that in 1948 only one-half as much highway construction was put in place as in 1936.

In 1936, the nation spent $920 million on highways; in the same year, 518 ton-miles of vehicles moved over the roads. Thus 1.8 mills of construction money was spent for each gross ton of traffic moving one mile.

Last year over $1½ billion were spent for construction and an estimated 952 billion ton-miles of traffic moved on the highways, amounting to 1.7 mills per ton-mile. But in terms of the 1936 dollar, Bright said this was less than .9 of a mill.

Spend $3½ Billion Since War

In another address R. K. Stiles, president of the Construction Industries Association of the ARBA, also pointed out that since the war America has spent $3½ billion on highways, but in terms of 1939 dollars, the amount of highway construction amounted to about one-half of this. He added that the United States is on the threshold of a highway era in which increasing traffic will demand, according to PRA estimates, expenditures of $60 billion over a 15-year period to make the highway system what it should be.

Stiles is executive vice-president of the Austin Western Co., Aurora, Ill., and said that the shortage of construction equipment has been alleviated and that contractors should experience no difficulty in getting whatever they need.

Better Highways Clear Up Congestion

Col. Enoch R. Needles, president of ARBA, also stressed the need of better highways, stating that they would be a cure for traffic congestion.

"The vexing and perplexing problems created by traffic in America's cities, large and small, offer daily proof that our roads are inadequate. Since the war 10 million new motor vehicles have been registered. Since 1930 our population has increased 25 million. These things call for additional living space, which, under the American concept of the automobile as a necessity rather than the luxury it once was, means additional travelling space."

Needles saw in highway construction the creation of steady employment over many years.

"There are definite signs of an oncoming decline," he stated, "from the unprecedented business activity of the last few years, and the time has come to effectuate some of the postwar planning for high employment that was done on such a large scale during the war years. The foresight manifested then should stand us in good stead now."

• Preliminary grading and landscaping work on the grounds of St. Elizabeth's hospital in the nation's capital is being handled by this Bucyrus-Erie TD-9 Bullgrader, owned by Whittington and Brown, Washington, D. C. The heavy, wet mud — like rubber — is pushed around by the grader at a 850-yd. per day clip.

Teamwork Builds Park in Western City

By Tom Riley

It seems like a miracle but what actually happened recently at Washougal, Wash., was a combination of community effort and modern machinery.

● By the end of April, Caterpillar D-7 and D-8 were grading the banks left by excavation done last summer at Washougal, Wash., where residents and contractors have donated equipment and time to build a $150,000 park for the town of 1,400. The banks will furnish natural bleachers—homeplate has been spotted near the rear dozer in this picture. Topsoil brought in by trucks is stockpiled at left. Picnic grounds will be located in distance along river.

Washougal is a small town in the southern part of the state where the 1,400 inhabitants decided they wanted a good city park and ball field as well as picnic grounds and a swimming beach. So, a little over a year ago, this town started to work on a $150,000 city park project, now almost finished.

Excavating and filling was by far the biggest part of the job. Now completed, this work cost only $500 of $2,500 donated. This part of the job was done entirely by local firms who donated their equipment and men's time to the project. Contractors, local manufacturers, logging companies—everyone who had heavy equipment—sent it over to the park site when not needed elsewhere. Even out-of-towners helped. A contractor in a town 20 miles away donated the use of a shovel when he heard the work was getting too tough for the dozers.

10-Acre Site

The site—10 acres of timbered land on the south bank of the Washougal river—was donated. The best place for the ball field and picnic grounds was in a picturesque, natural amphitheatre alongside the river but getting it into shape required cutting back a 40-ft. bluff and removing 45,000 cu. yd. of material. Washougal decided in June, 1948, to move the bluff. Groups of citizens immediately began grubbing the land, clearing the 10 acres of brush and excess trees—a job that continued throughout the summer.

Ground was broken by the first bulldozer on June 23, 1948. A. R. French, an engineer who donated his time to the project, used dozers to cut down the bluff. From June until September, when work was stopped by the rainy season, at least one dozer was on the job all the time. Cat D-8's and D-7's as well as Cletracs from various companies arrived and left, each staying a few days to work on the big cut. M. C. Skelton, lumberman, was the biggest contributor of dozers, paying out $12,000 in wages to his catskinners while on the project. The town furnished maintenance for the machines—greasing, fuel, tools, and lighting facilities for night work.

Project Begins Again in April

This year the project began rolling again in April. The nearby Crown Willamette Paper Co. kept a D-7 dozer on the job throughout the month. Other dozers arrived and stayed as long as possible, working nights to do as much as they could. When the excavation ran into exceptionally large boulders and compacted conglomerates, the Smith Bros. Co., Contractors, Vancouver, Wash., sent in their ½-yd. Bucyrus-Erie 15-B shovel for a week to take out the tough material. Trucks brought in free of charge 1,000 yd. of river bottom silt to cover the rocky ground. And a Caterpillar 11 grader owned by Chester Jones of Washougal levelled

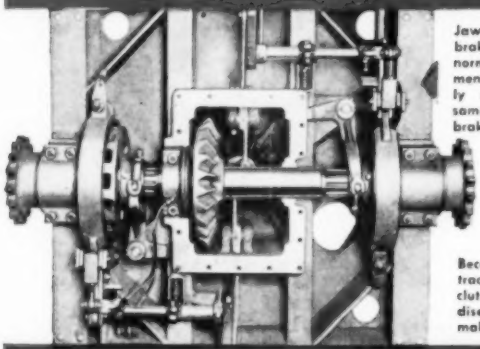
Continued on page 42

● A diversion channel on the Republican River flood control project at Cambridge, Neb., is being excavated here by a 1½-yd. Koehring 605 dragline while a Caterpillar 12 motor grader blades to grade on the channel bottom. Lines along the benches facilitate dewatering of the site to permit further excavation at th base of the benches. The pump on the lowest bench is raising water to the surface through the wellpoint system.

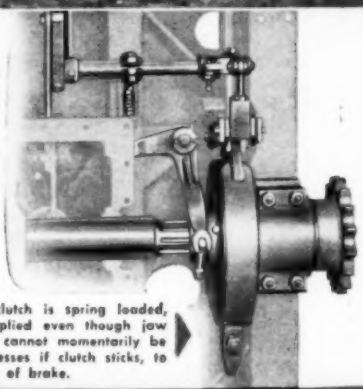
KOEHRING 205

HALF YARD

Works Safely on 30% Grade without Blocking



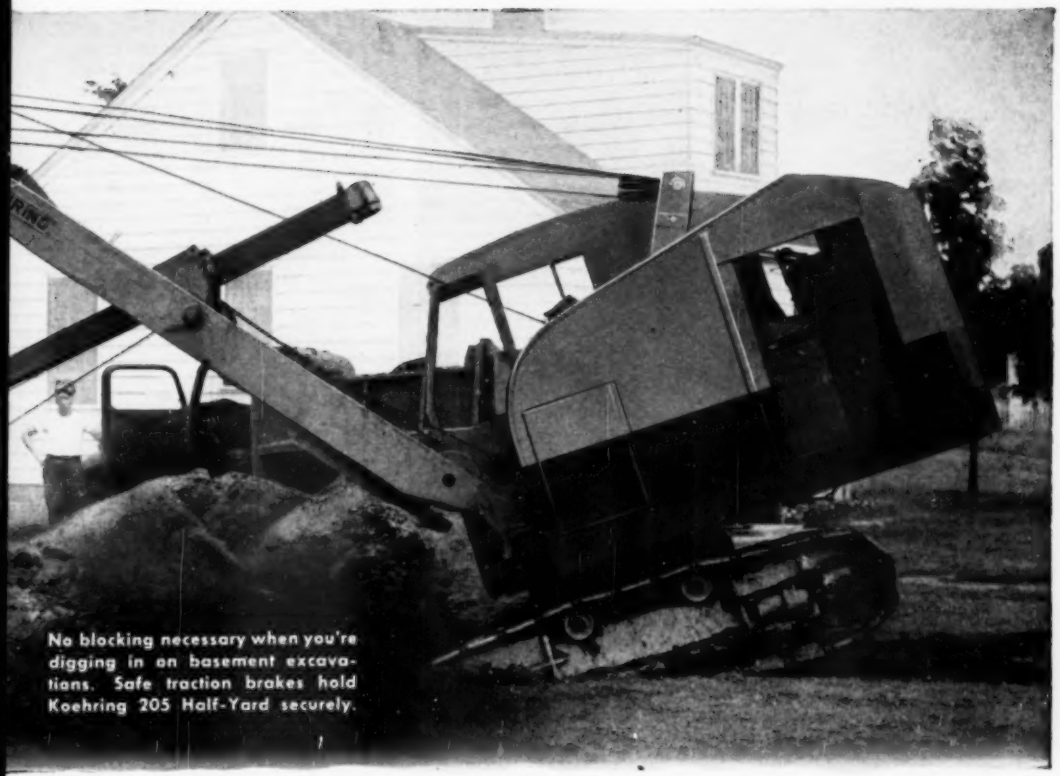
Jaw clutches and traction brakes work as a team. In normal operation, engagement of brake automatically disengages clutch for same crawler. Applying both brakes locks 205 securely for all operations.



Because linkage to jaw clutch is spring loaded, traction brake can be applied even though jaw clutch is locked tight and cannot momentarily be disengaged. Spring compresses if clutch sticks, to make possible engagement of brake.

HERE'S ANOTHER KOEHRING UNIT THAT WILL SAVE TIME ON YOUR DIRT-MOVING JOBS . . . HEAVY-DUTY DUMPTOR

6-yard Koehring Dumptor has constant-mesh transmission, eliminates delay for shifting gears . . . has three fast forward and reverse speeds, can shuttle from shovel to dump, eliminates turning delays . . . has instantaneous gravity dump, saves 10 to 20 seconds in unloading time every cycle. They're engineered and built to haul tough materials over rough terrain and steep grades . . . are easy to operate . . . simple to maintain . . . will give you less down-time, more work-time. Ask your Koehring distributor for complete Dumptor facts TODAY.



No blocking necessary when you're digging in on basement excavations. Safe traction brakes hold Koehring 205 Half-Yard securely.

Saves Time on Every Job

You can work safely on a 30% grade without blocking crawlers on the Koehring 205 Half-Yard. Crawlers are held by big friction brakes, not by a pawl or jaw lock. These friction brakes provide the flexibility that's necessary to cushion brake assembly against operating shocks. That's why there's no danger of brake damage on the 205. Without blocking you will save time on any job.

Here are other advantages of the Koehring 205 Half-Yard brake and steering system:

Traction brakes can be applied at any time, on any grade. Safety spring in operating linkage lets you apply traction brakes even when traction jaw clutches are locked and cannot be disengaged. Your 205 will never run away from you on the grade.

- By applying power to one crawler, and brake to the other, you can turn in a tight circle, within 205's own length.
- Easy to make wide turns under accurate control.
- Operator never leaves cab to apply traction brakes or to steer. Separate levers in cab control friction brake as well as jaw clutch for independent operation on each crawler.
- Full steering and brake control is available with cab in any position.

Your Koehring distributor can show you many other ways this versatile Half-Yard can save time, money and increase production on your excavating jobs. Ask him, too, for facts and figures on the larger 304, 605 and 1005 excavators.

KOEHRING HEAVY DUTY

KOEHRING COMPANY
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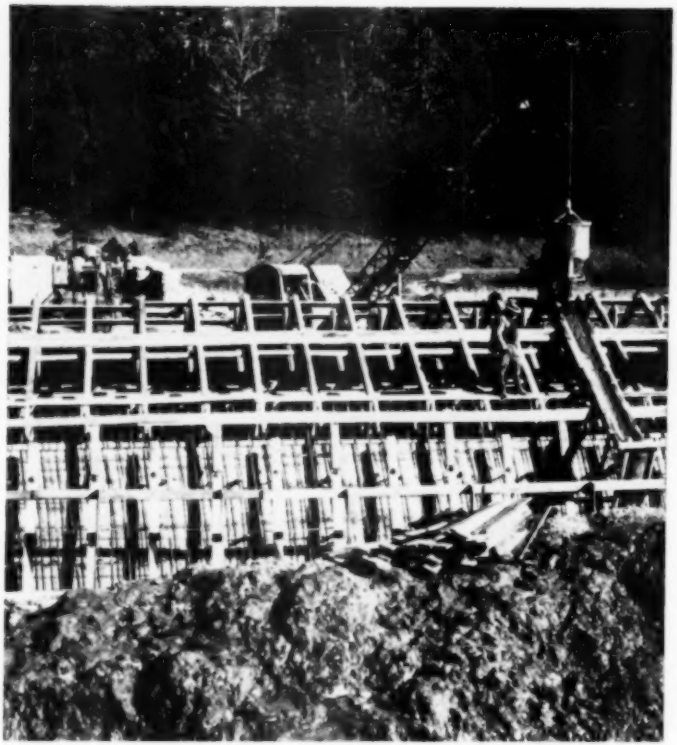


• An arch culvert — 30 feet wide, 19 high and 72 long — is under construction in TVA's Hiawassee Lake near Murphy in western North Carolina. T. F. Houser, Asheville, N. C., is the contractor. Here a batch of concrete is poured from a homemade bucket, swung from a Bucyrus-Erie 15-B crane. The bucket, of 15-cu. ft. capacity, handles 10-cu. ft. batches, placing about six cu. yd. per hour. Concrete is mixed in Rex 10-S concrete mixer (left). The contract calls for a total of 321 yards. When the lake is full, water will come within six inches of the top of the arch.

News

Continued from page 39

the topsoil to cover the ball field and picnic grounds with a 12-in. bed for grass.

"Play ball!" was heard in June. Public spirit has been at such a high pitch that a drive is now on to raise funds for night lights on the ball field and cement bleachers on the sloping bluff. The 1,400 residents of Washougal claim theirs will be the best city park in the region.

Open Pit Mining Group Meets July 22

Members of the Open Pit Mining Association will convene at their 1949 annual meeting at Purdue University, LaFayette, Ind., on July 22. "Lightning Protection," "Resistance Measurements," "Dielectric Absorption" and "Voltage Regulation" will be the subjects of the various sessions. Floor discussion will follow each presentation.

Personnel in the electrical departments of the open pit mines will attend the meeting.

Bureau of Reclamation Names Northwest Head

Harold T. Nelson has been named new regional director for the Bureau of Reclamation in the Pacific Northwest. He succeeds Robert J. Newell who will retire on July 1. The region covers the States of Oregon, Washington, Idaho, western Montana, and portions of Nevada, Wyoming and Utah.

Nelson, an employee of the Bureau for 13 years, has served as assistant regional director since 1946, prior to which he was construction engineer on the Roza division of the Yakima project.

Newell has been with the Bureau continuously since 1923. He has worked on the Owyhee, Vale and Black Canyon projects in southwestern Idaho and eastern Oregon, the Boise project, Deadwood Dam, and Cle Elum Dam on the Yakima project in central Washington. He became regional director of Region 1 in 1945 and as such has been in charge of all the postwar planning and construction work in the Columbia Basin.

Sturgis Succeeds Pick in Missouri Basin

Brig. Gen. Samuel D. Sturgis, Jr., has been made division engineer, Missouri River Division, for the Corps of Engineers. He succeeds Maj. Gen. Lewis A. Pick who is now Chief of Engineers. Col. Louis W. Prentiss, Omaha District engineer, has been acting engineer for the Missouri River Basin since Gen. Pick's departure.

The Missouri River Division includes all or parts of 10 states and comprises 529,000 square miles, about ⅙ the land area of the United States. Brig. Gen. Sturgis will carry out the Corps of Engineers part of the Pick-Sloan plan for the Basin which provides for flood control, irrigation, power development, navigation and other public uses of water resources. In addition, he will supervise construction of a number of veterans' hospitals and military installations such as the superhangar at Rapid City, S. D.

For two years, Brig. Gen. Sturgis served as district engineer at Eastport, Me., on the Passamaquoddy Tidal power development. He was also executive officer in the Huntington, W. Va., Engineer District during a period of construction of flood control and navigation works in the Ohio River and its tributaries, following the disastrous Ohio River flood in 1937. He also participated in the construction of flood control works on the Mississippi River and building of military installations in the early 1940's.

During World War II, he was Chief Engineer, Sixth Army, in charge of all airbases, port and Army construction in 22 amphibious operations from Australia to Japan. He was deputy director of the organization and training division, General Staff, when he received his appointment to the Missouri Basin.

Marquette Cement Aids Tornado Area

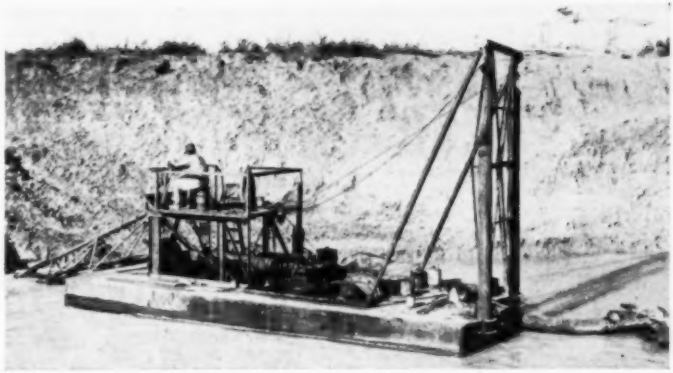
Facilities and equipment of the Marquette Cement Mfg. Co. plant at Cape Girardeau, Mo., were put at the disposal of disaster relief authorities there by company officials in Chicago promptly on receipt of news reports of

the devastating tornado which hit Cape Girardeau late Saturday, May 21, killing 21 residents, seriously injuring 72, and destroying or badly damaging 433 homes.

Marquette trucks, bulldozers, power drills, shovels, scoops and draglines were offered, with operators, to speed relief work in the hard hit north end of the city where damage was estimated at $3 million.

The company also temporarily withheld cement shipments out of that plant to other areas, granting priority to local dealers in order to assure prompt availability of cement there for the duration of the emergency.

The Marquette plant, located near the south limits of Cape Girardeau, escaped damage and remained in operation. One employee was killed in his home.



• Affoiter and Garnett, contractors of Rio Hondo, Tex., are using this home-designed dredge to dig a ship basin adjacent to Colorado Canal between the Gulf of Mexico and Harlingen, Tex. The hull, made of welded steel with standard ship deck plating, accommodates driving machinery in a specially constructed hold compartment. A platform containing all engine and equipment controls is positioned well above the deck level. A General Motors 71 diesel engine is V-belt connected to an 8-in. centrifugal pump. Turning at 560 rpm, the pump throws out 1,800 gpm of water, mud and clay mixture. Normally the dredge will bank 1,000 cu. yd. in a 10-hr. day. At this point, discharge was through a 600-ft., 8-in. pipe with a lift of a little more than 27 feet.

Foreign Highway Men Attend PRA Course

Approximately 60 highway officials and engineers from 17 foreign countries are attending a special course of instruction in American highway practices being conducted by the Public Roads Administration of the Federal Works Agency. The 17-week course started on May 16.

The first six weeks, which are being spent in Washington, are devoted to lectures and group discussions conducted by PRA engineers. Subjects include the place of highway transports in American economy, historical development of highways, highway administrative procedures, fiscal and legislative policies, highway planning, highway design, methods and economics of highway location, bridge construction, soil stabilization and highway drainage. The final week will be given over to discussions of construction management, equipment selection, construction methods and highway maintenance.

After completion of lectures in Washington, groups of foreign engineers will be assigned to different states to inspect highway projects under construction. Instructive programs in each state will be arranged by the district engineers of PRA in cooperation with the state highway departments.

Indian Delegation Is Largest

Countries sending delegates to Washington to attend the course include Australia, Brazil, Canada, Colombia, Venezuela, Mexico, Denmark, Finland, Netherlands, France, Spain, Sweden, Great Britain, Greece, Turkey, India and Pakistan. Largest delegations will come from India, sending nine representatives of national and provincial highway departments, and from Greece, sending six engineers. All expenses of the delegates are borne personally or by their governments.

• Morrison-Knudsen Company and Peter Kiewit Sons' Co. are starting a 3-year $13 million building project at Washington's Grand Coulee Dam. A Lorain dragline is excavating rock in the site of a new pumping plant which will serve the Columbia Basin project irrigation system in eastern Washington.

Canyon Constructors Get Canyon Ferry Dam Job

Contract for the construction of Canyon Ferry Dam and power plant in Montana, a unit of the Missouri River Basin project, has been awarded by the Bureau of Reclamation to Canyon Constructors on a bid of $11,896,425. Canyon Constructors is a joint venture consisting of Brown & Root, Inc., Houston, Tex.; Wunderlich Contracting Co., Jefferson, City, Mo.; and J. C. Maguire and Griffith Companies, both of Los Angeles, Calif. Maguire will be the operating partner.

The award was made on a second call for bids after all original bids

were rejected as excessive. The low bid at the first opening on December 1, amounted to $12,940,845, submitted by the same group which now holds the contract. Bureau of Reclamation Commissioner Michael W. Straus pointed out that the $1,044,420 difference is not all savings because the revised specifications eliminate certain work estimated to cost about $353,000 and also contain a price adjustment or escalator clause.

Canyon Ferry Dam, which will create a reservoir of 2,050,000 acre-feet capacity, will be located on the Missouri River approximately 17 miles east of Helena, Mont., and about 1¼ miles below the existing antiquated Canyon Ferry Dam. Negotiations are now under way to purchase that site which will be inundated by the larger, multiple-purpose Federal structure.

Flood water will be impounded to permit the irrigation development of 310,700 acres of new land and provide supplemental water for 196,300 acres above Fort Benton, Mont. The project will provide irrigation storage in connection with the Helena Valley unit of the Helena-Great Falls division. Water for this area will be pumped from the reservoir. The power plant will contain three generating units with a combined capacity of 50,000 kw.

Fort Gibson Dam Contract 74% Complete

Seventy-four per cent of the principal contract for the Fort Gibson Dam project in Oklahoma has been completed. Let for $39,600,000 in May, 1946, to joint venturers, Al Johnson Construction Co., Winston Bros., and Peter Kiewit and Sons, the contract includes construction of the dam and spillway, power intake structure, elevator and stair tower, water storage tank, and installation of sluice, tainter and penstock gates, and other appurtenances. Completion is set for next February.

The entire project, largest Corps of Engineers program underway in the Tulsa district, is 40% complete. The 250-ft. dam, located on the Grand (Neosho) River, five miles northeast of Fort Gibson and 12 miles from Muskogee, will function in the control of floods by 1951; power will be generated by 1953. Its reservoir will extend upstream 39 miles to the Markham Ferry Dam.

Grand River is one of the principal flood-producing tributaries of the Arkansas River. It contributed 60% of the peak flows on the Arkansas at Muskogee during the highest floods on record, one in May, 1943, the other in Fall, 1941. The drainage area above the damsite is 12,615 square miles—the dam will control the run-off from over 99% of the entire basin.

290-ft. Diversion Gap

During the construction work now in progress, the river is being diverted through a 290-ft. wide section of the spillway, left low for this purpose. Grouting of the foundation from the gallery is now underway. During the next and final stage, the 290-ft. opening will be closed and ten sluices will be utilized for passage of stream flow. Flood flows, if any, will be diverted through the intakes of the powerhouse.

Major earthmoving and fill items in the present contract consist of 550,000 cu. yd. of common excavation, 96,000 of rock excavation, 304,000 of common fill, 37,500 of rockfill and dumped riprap, and 10,000 of derrick stone. Five hundred thousand cu. yd. of concrete will go into the structure.

Engineer Takes Bureau Techniques to Rhodesia

Techniques and construction methods which the Bureau of Reclamation has developed in building earthfill dams are being made available to Southern Rhodesia by the loan of a Bureau engineer to that country at the request of the Department of State. David R. May, who was construction engineer on the recently-completed earthfill Jackson Gulch Dam on the Mancos project, Colorado, will check sites there and the availability of materials. His salary and expenses are being paid by the Rhodesian government.

May has been Bureau engineer for 17 years, his first job being in connection with the cement investigations for Hoover Dam. He has spent 2½ years on the Mancos project where he supervised construction of a dam requiring two million cu. yd. of fill and costing about $3½ million.

Request for the services of a Bureau engineer such as May resulted from a visit to the United States by Mr. Robertson, former secretary of irrigation and agriculture for Southern Rhodesia, and two engineers from the Union of South Africa. They visited the Bureau's Denver, Colo., design and construction office and several projects. After inspecting earthfill dams they expressed the opinion that such dams would work out at several sites in their areas.

From the States

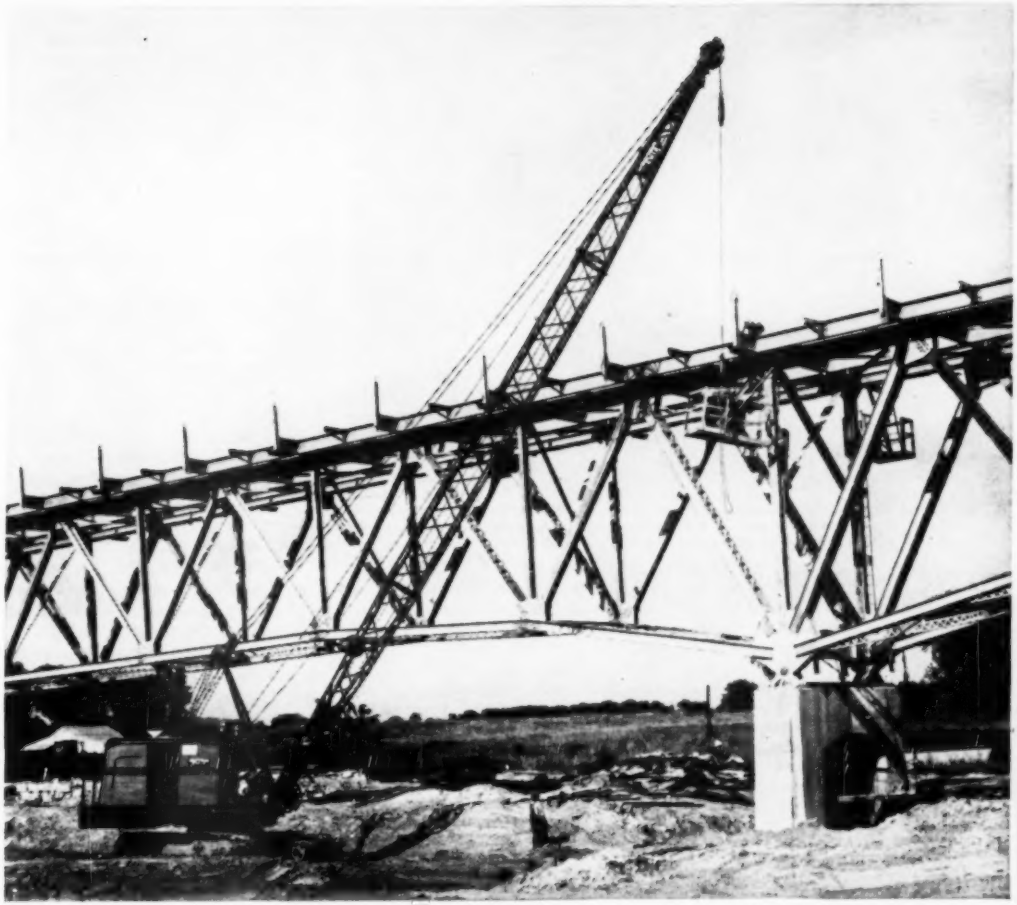
Ark. Court Upholds Bond Issue

Clearing legal obstacles from the path of an $80 million, 4-year road building program in Arkansas, the State Supreme Court affirmed a Pulaski County Chancery decree upholding the validity of Gov. McMath's plan to issue $28 million in new bonds to supplement other highway revenue.

The 1949 Arkansas Legislature authorized the state to issue $7 million in bonds annually for the next four years. The plan was approved by the voters in a special statewide election last February. A suit testing the validity of the bond plan was filed in Little Rock. In ruling on the test suit, the Court said that security offered bondholders when the 1941 state highway refunding bonds were sold "has not been impaired or lessened" by the new bond plan.

Sale of the first $7 million in new bonds was planned for June 9 with

• Charles E. Smith is using three ¾-yd. Bucyrus-Erie 22-B draglines to strip and load gravel in this pit 15 miles southeast of Dallas, Tex. Two draglines spend most of their time stripping the 15-ft. deep overburden while the third loads gravel to trucks from the 10- to 18-ft. deep deposit.



Top honors for this bridge hand

Precision control that can spot loads on a dime . . . strength to handle those loads safely and easily . . . wide, sure-footed mounting that means stability for fast action — these are some of the features of the Bucyrus-Erie 38-B that earn it top honors on this bridge erection job.

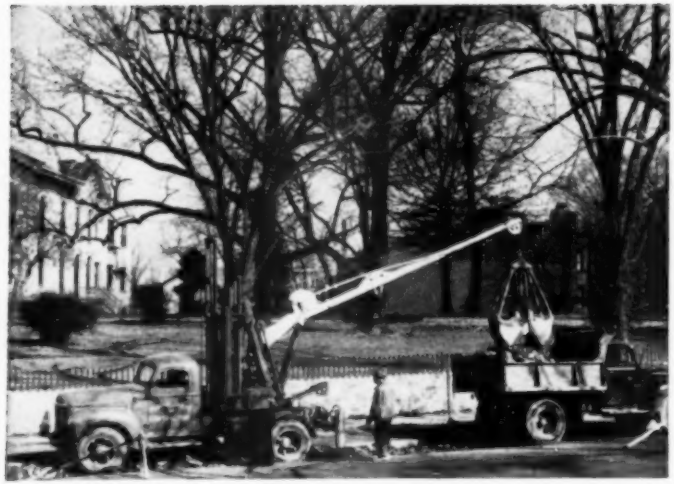
Besides turning in outstanding crane performance, the 38-B works with equally high efficiency as clamshell, dragline, shovel and dragshovel. Leading contractors all over the country can testify that, whatever front end, the 38-B is an output leader, with the stamina to stand up to rough work month after month. See your Bucyrus-Erie distributor for more information about the 38-B, and the other machines in Bucyrus-Erie's ⅜- to 2½-yd. line. 147E49C

BUCYRUS ERIE

The BEST buy Bucyrus, the best BUY in excavators

Bucyrus-Erie Company

South Milwaukee, Wisconsin



• In about an hour this Bucyrus-Erie H-2 Hydrocrane finished loading 20 to 30 yards of macadam surfacing to a Ford truck prior to a paving patch job in Washington, D. C. McGuire and Rolfe of Washington, who own the rig, use it on 15 to 20 locations every working day.

an additional $7 million expected to be issued in each of the next three years. Proceeds will be matched with state and Federal funds to finance the 4-year program.

Arkansas also recently enacted a bill increasing truck license fees. Revenues from this source will increase about $3 million annually as a result.

New Mexico Ups Gasoline Tax

A bill increasing New Mexico's gasoline tax from five to seven cents a gallon has become law. To go into effect 90 days after the end of the 1949 legislative session, the measure provides that receipts from the 2-cent increase be used for retirement of present outstanding highway debentures.

PRA Approves Okla. Program

All Federal Aid highway projects submitted in the 1949 program of the Oklahoma State Highway Commission have been approved by the Public Roads Administration. There are 26 projects in the list, amounting to over $9½ million.

The program also includes 26 state projects amounting to nearly $4½ million or a total program of $14 million, exclusive of urban funds and contract replacements. The total provides $143,408 for a statewide highway planning survey.

Highway construction costs are unmistakably on the downward trend in Oklahoma according to State Highway Director H. E. Bailey. April contract letting was the sixth consecutive where combined low bids fell below engineering estimates. Combined low on 29 awarded projects was a little more than $208,000 below combined estimates.

Since October the Oklahoma Commission has awarded contracts on 563 miles of road and bridge construction and incidental work for $12 million, $950,000 under estimated costs.

All types of construction from gravel-surfaced farm-to-market roads to concrete paving and bridge construction have felt the descent.

Life of the Oklahoma Turnpike Authority has been extended for two more years by the Oklahoma Legislature. The new bill authorizes issuance of revenue bonds for a maximum of 40 instead of 35 years to finance a proposed toll road between Oklahoma City and Tulsa. The Turnpike Authority law enacted by the 1947 Legislature would have expired August 1 unless the road was actually under construction. Up until now the state has been unable to sell bonds to finance the project.

Housing

Continued from page 15

pipe and installation for Johnson. Main sewage lines required 1,044 feet of 10-in. concrete pipe; 3,000 feet of 8-in. concrete pipe and 200 feet of 6-in. concrete pipe. Laterals from the streets to the houses took 9,000 feet of 4-in. pipe. Average depth of the lines, excluding the laterals, was nine feet.

Intercity started this job last December, using two ½-yd. Insley K-12 backhoes for the trenches, cutting them to bucket width—30 to 36 inches. An International TD-9 was used for backfilling after the pipe was placed. No rock was expected by Sig Moe when he entered the sewage line bid and none was encountered.

The water line contract, a separate job, was started for the Mountain State Power Co. at approximately the same time. Intercity placed the pipe for $21,000. Mountain States furnished the pipe.

Five thousand, two hundred feet of 12-in. iron pipe were laid for the water main serving the subdivision. plus 1,278 feet of 8-in. iron pipe, 4,680 feet of 4-in. iron pipe and 300 feet of 2-in. galvanized pipe.

A ⅜-yd. Bucyrus-Erie 10-B backhoe dug trenches which averaged three feet deep with a bucket width of 30 inches. Another of Intercity's five TD-9 International dozers with Bucyrus-Erie blades accomplished backfilling.

Even though the operation was less than three miles from the shops, Intercity never placed a grease man on the job. On any small project where few machines are involved, Sig Moe prefers to give each operator one hour of time each day to maintain his equipment. Greasing is a definite daily requirement.

Place Pipe During Winter

Both sewage and the water lines were placed during the past winter months, the worst in 80 years on the Pacific Coast. Intercity's job superintendent, Jim O'Donnell, had no short time limit on the operation as the erection of the houses could not start until spring. He nevertheless took advantage of the weather, pushing his backhoes and dozers over the soggiest areas when they were frozen, actually speeding the job. For a few days the ground was frozen too hard for digging but, in toto, the extreme weather of this January and February was an asset rather than a loss for the company.

In March, when the sewage and water lines were ready, Johnson crews arrived to place cement foundations for the pre-assembled dwellings. Under Superintendent Harley H. Hedges, the Johnson crew of 30 men, including surveyors and cleanup men, placed the 136 cement foundations in one month. About 25 carpenters kept two cement trucks humping to fill the forms, though the trucks had to haul only from the center of the subdivision, a distance of 100 to 1,000 feet.

C. M. Kemp, concrete contractor,

received the bid to furnish the concrete for the foundations. Jack Keebler, concrete contractor of Eugene, Ore., subcontracted the job from Kemp, moving in a 2-yd. Standard Mixermobile to furnish a 1-3-5 mix on the job at $10 per yd. He also used two Ford trucks with Dumpcrete beds, one 3-yd. and one 4-yd.

When Johnson moved in last March, the subdivision, flat farmland without rock, was also without a bottom. Thawing and the heavy spring rains had churned the ground into gumbo, so bad that the carpenter crews used horses to move their forms across the lots from one house to another—a tractor would have mired in many places.

Mud Makes Going Tough

Keebler, though able to keep on the streets most of the time, had extreme difficulty in moving his dual-axled Ford concrete trucks up to the foundation forms even when he used planking. He tried Truck Track attachments and states that these attachments worked exceedingly well on his trucks—says he could not have performed the job without them.

Foundation forms were built in sections of 2-in. lumber so made that they could be re-used several times. Thirty-six sets of forms were built for the houses at the beginning of the project and they were used for all 136 foundations. Levelling the 2x4 wood plates on top of the foundations was done by two survey crews who moved the plates up and down in the still-soft concrete. At first, the plates were placed after the concrete had set, grouting them into level, but the other method was found to be both faster and better.

First House Arrives in April

First of the pre-assembled houses arrived April 13. Placing them on the cement foundations is a rather delicate operation. Of Intercity's nine machines, only a Bucyrus-Erie 22-B—rented to Johnson for $1,400 a month plus the operator's wages—is being used for the job. These pre-assembled houses are sectioned by rooms, not by panels, expressly packaged for erection with a crane. Two sections are transported on a flatbed truck equipped with a special trailer—two trucks and trailers carry a complete house.

The 22-B lifts the rear section of a house from the truck, swings it through the air, and places it on the rear of the house foundation. The next section is then placed on the foundation and

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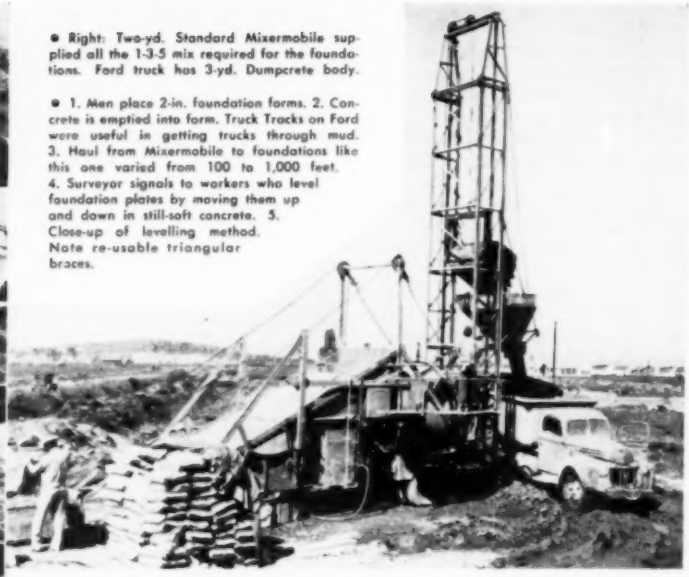
• 1. Men place 2-in. foundation forms. 2. Concrete is emptied into form. Truck Tracks on Ford were useful in getting trucks through mud. 3. Haul from Mixermobile to foundations like this one varied from 100 to 1,000 feet. 4. Surveyor signals to workers who level foundation plates by moving them up and down in still-soft concrete. 5. Close-up of levelling method. Note re-usable triangular braces.



• Right: Two-yd. Standard Mixermobile supplied all the 1-3-5 mix required for the foundations. Ford truck has 3-yd. Dumpcrete body.

carpenters jack it back to fit snugly against the first. Succeeding sections are placed in the same manner until the house is complete. The whole operation takes 1 to 1½ hours. The 22-B moves to the next foundation, carrying mats of heavy timbers along to place on the bottomless mud.

After the crane operation, carpenters take over the house, placing the exterior siding floors, roof, etc. All such materials are packed on the ceiling joists of the house sections. Kitchen, bath, doors, and windows are complete on arrival. Painters finish the house when the carpenters move out, decorating it inside and out. The house is finished in 10 days after arrival.

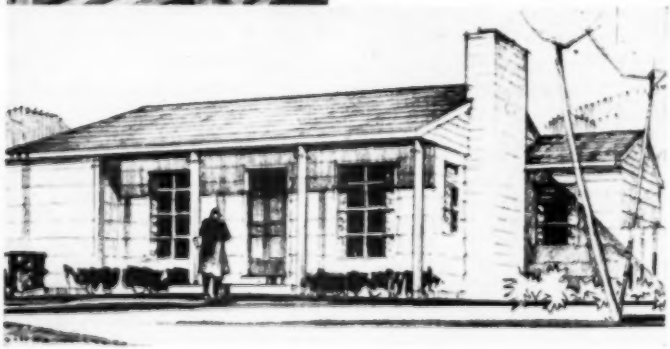
All the houses are expected to be set up and completed by next month, two complete houses arriving every day from the Johnson plant in Portland.

Before the project is finished, Intercity will move equipment back into the subdivision to pave the streets with eight inches of top metal 1½ inches of crushed, plus bituminous oiling with spread bar. Eighteen thousand square yards will be placed on the streets for a contract price of $14,000. Nine thousand square yards of the same material will be placed on the driveways of the 136 houses for $10,000.

While working on the Springfield Homes housing project, Intercity has also been doing a $340,000 road job in the highest state-maintained pass in Oregon, Warner Canyon, and furnishing 40,000 cu. yd. of crushed rock to the Bureau of Roads and a logging company, as well as doing several small sewer contracts in the region near the home shops. Sig Moe's varied jobs scattered throughout the area give him lots of chances to make good use of the radio telephone in his business coupe.

Besides the many outside jobs he sells sand and gravel from one yard up over the counter.

Sig Moe is interested in any excavation project bigger than a fish pond. He says, "Sometimes I like the small ones the best."



• Architect's sketch of one of the preassembled Johnson houses. This is 3-bedroom dwelling which is trucked in five sections. The homes are built with various sidings (shake shown) and standard gabled roof, both added as in ordinary construction.

Expressways

Continued from page 19

charge of R. D. Whittle, superintendent, and A. R. Martin, assistant superintendent.

Another contract for grading, paving and providing storm sewers for .64 mile of the downtown section was awarded to Uvalde Construction Co. of Dallas and completed last September. This award was for $147,200 and was under the supervision of L. W. Hegler.

Let Two More Contracts

Two other contracts on the downtown section were let recently. One, amounting to $106,300, went to Uvalde for storm sewers, grading and paving of .37 mile. C. E. Powell is superintendent. The other contract was given to Austin Bridge and Austin Road for $334,500 to accomplish railroad grade separation under the Santa Fe track and to put down storm sewers. Grading and paving are also included in the contract. M. W. Grumbles for Austin Bridge and Andy Rogers for Austin Road are the superintendents.

Engineer-manager at Dallas for the Texas Highway Department is T. E. Huffman and supervising urban engineers are Douglas Nettleton, O. G. Rayner and O. C. Andersen.

Work at Houston

Essence of the present Houston plan is a 4-street system downtown designed for 80,000 cars a day at 30 mph with synchronized lights controlled from one master timer. One mile of 4-street system and five miles of expressway with no grade crossing will be completed next year at a total cost of about $10 million. The complete system envisaged for Houston may come to $60 to $75 million plus $25 million for the right-of-way.

This will probably provide two-thirds of the expressways needed by the city in the next 25 years. Feeders and major traffic arteries will probably require a like amount of money.

Signal System Largest in Nation

Nineteen streets will cross the 4-street system to make a large loading and unloading area near the central business district. The signal system required, said to be the largest single installation of its kind in the country, will cost about $300,000. The design estimate (1960 basis) is 75,000 cars a

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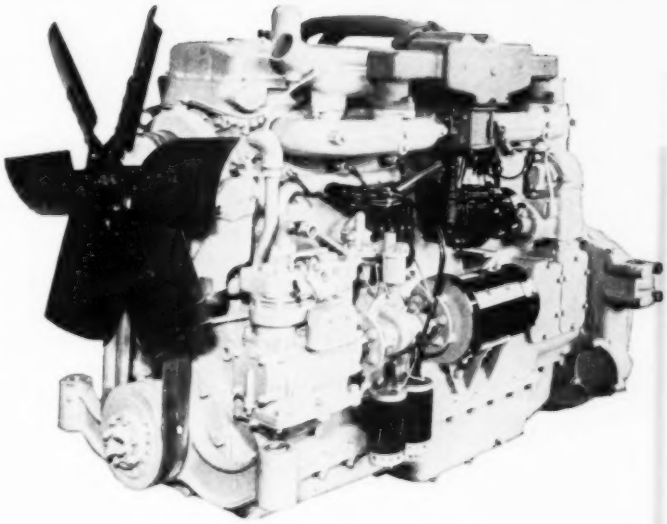

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day, of which 25,000 cars are expected to be through traffic.

Contractors are Brown & Root, Inc. (four contracts totalling $5,226,000) and R. P. Farnsworth & Co., Inc. (two contracts totalling $2,504,000).

Engineer-manager at Houston is W. J. Van London.

Fort Worth Expressway

Fort Worth plans for the next 10 years envision 17.6 miles of expressway, 9.1 miles in an east-west road and 8.5 miles north-south. Designed for maximum speeds of 55 to 60 mph, these expressways will provide access with accelerating and decelerating strips every ¼ mile in congested parts to ½ mile in outlying sections. The maximum curve will be 4% and the 2-lane roadway will enlarge to three 12-ft. lanes downtown. Rights-of-way vary from 284 to 305 feet. A cloverleaf interchange will be constructed at the intersection of the two expressways.

Contracts have been let to Austin Road Co. and Worth Construction Co. ($1,665,245) on 2.08 miles of the north-south section, and to Austin Road, F. M. Reeves & Sons, Markham & Brown & Kearney, Crume & Co., and the Austin Bridge ($2,402,104) on 3.86 miles of the east-west section. Project manager at Fort Worth is E. C. Woodward, and supervising engineers are F. E. Lovett, Floyd Smith and A. M. Gordon.

San Antonio Project

Seven miles of highway approved and planned will cost about $10 million and are scheduled for completion in 1953. Design speeds of 55 mph assumes maximum of 1,200 cars per lane on the 2-lane expressway. In congested sections, the roadway will branch out into four lanes each way.

Twin 24-ft. lanes are separated by a median of either grass or concrete dividers. Grassed shoulders are 10 feet wide. This is a limited access system with bus turnouts for loading and unloading, and entrance and exit ramps. Pedestrian overpasses are ramped to facilitate scooter, bicycle, baby buggy and other traffic.

Present contracts are held by H. B. Zachry Co. ($2,354,200), and M. B. Killian & Co. ($2,815,000) and McKenzie Construction Co. ($1,111,000).

J. L. Dickson is engineer-manager for the San Antonio expressway work and H. G. Bossy, R. H. Ziegler, and R. O. Lytton are supervising engineers.

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DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

Continued from page 27

making possible overall filling.

A lagoon was constructed close to the dunes to launch the dredge which was brought overland and assembled on the site. Belonging to Messrs. Mears Bros., Ltd., London, the Gwynne dredge has a Paxman Ricardo 336-hp engine running at 600 rpm and driving a 16-in. pump with a 30½-in. diameter impeller. Eighteen-in. diameter pipes carry the discharge about 2,000 feet to a booster pump electrically drven by a 360-hp constant speed motor.

This mixture of sand and water is pumped another 4,000 feet at the rate of 11 feet a second to the discharge point. Maximum sand density is 17% and the mixture as placed is allowed to settle before the water runs off. Solid sand placement averages 250 cu. yd. an hour, return water being pumped back to the lagoon by a Gwynne 18-in. centrifugal pump at 7,000 gpm. Thus, the lagoon is maintained and enlarged. Of the almost 1¼ million cu. yd. of required sand fill, 800,000 have been pumped by the dredge to date.

Although the lagoon was artificially created to accommodate the dredge, it will not be a white elephant after fill work is completed. Steel plant plans call for a reservoir to meet the requirements of the works. The lagoon was carefully located on the spot chosen for the reservoir, making it possible to do two jobs for the price of one. When the dredge finishes its job, expected to be during this summer, only work remaining on the reservoir will be building of embankments.

Soil Stabilization

The fourth big problem confronting Wimpey is the encroachment of sand upon the land at a perceptible rate. For years it had been a headache in the area, but nothing much was ever done about it. The problem had to be tackled by the contractor, however, if the resulting steel works was to be free of a sand menace in years ahead.

Wimpey has undertaken extensive sand stabilization projects to prevent future encroachment. Mauran grasses, protected by small hedges of brushwood to break up the wind force, have been planted with marked success. Where large areas of sand dunes are cleared for fill, the bare patches are covered with silt and soil on which a belt of coniferous trees will be planted to further the stabilization program.

Drainage succeeded in lowering the water level from three to four feet, giving a dry top soil, but excavation had its own problems. Varying depths of clay and running sands were encountered while drainage culverts and foundations were under construction. Millars' wellpoints and sheet piling were used successfully. A layer of peat covers most of the site at depths varying from six to 18 feet, with thicknesses up to 12. This made piling more difficult as the piles had to fetch up under the peat. Diaphragm and air-operated C. P. T. sump pumps are used to clear water from the excavations.

Substrata variations made cast in situ piles necessary. Wimpey used three types—Franki, Simplex and West. Some precast piling may be used in later stages. About 17,500 piles out of the total 25,000 have been driven to an average depth of 30 feet. Frequent test loads are made on the piles, most of which have a rated bearing capacity of 60 tons.

Continued on page 54

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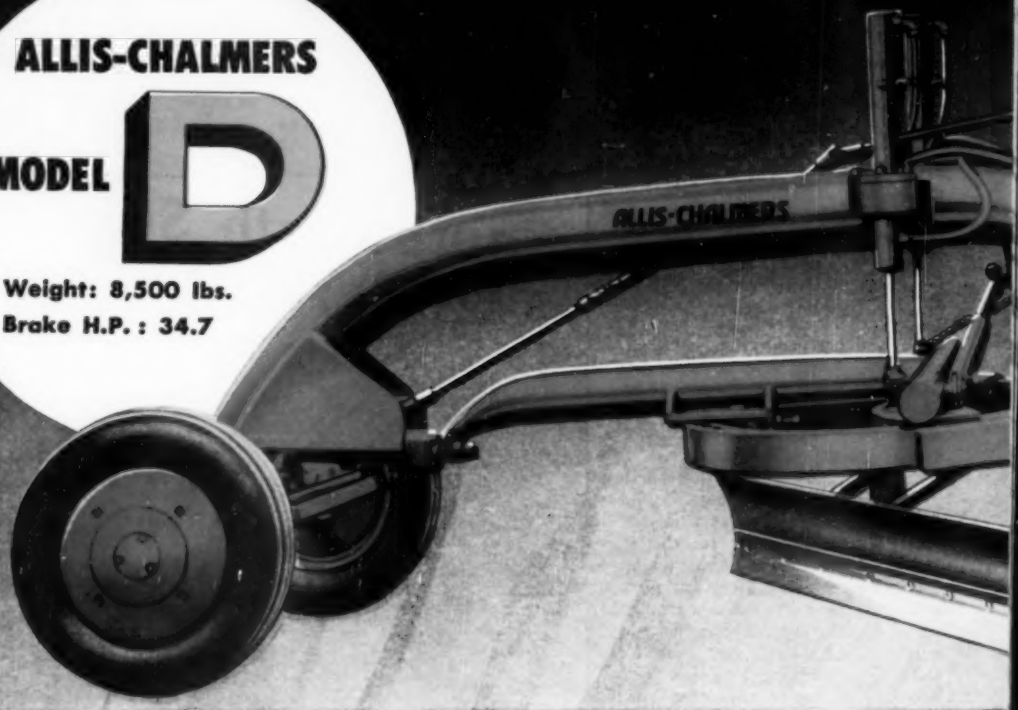

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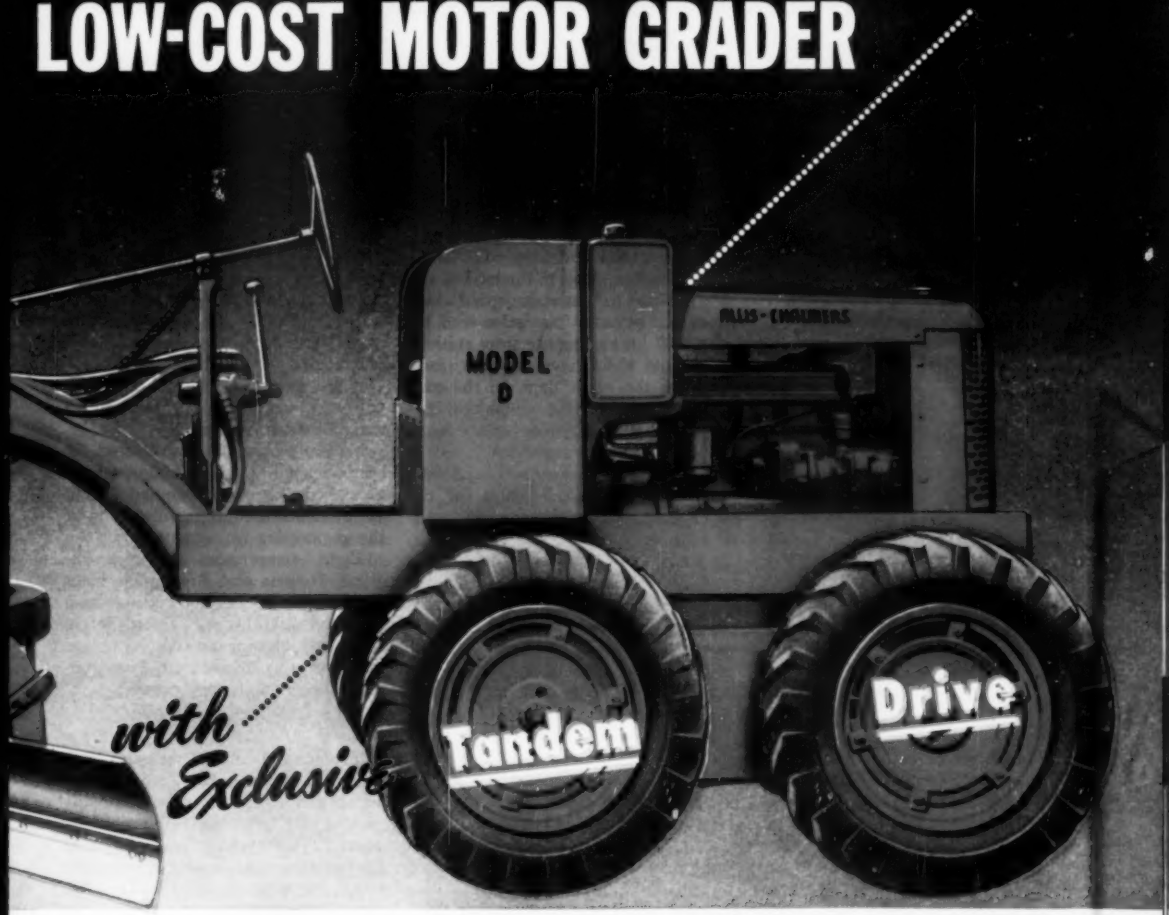

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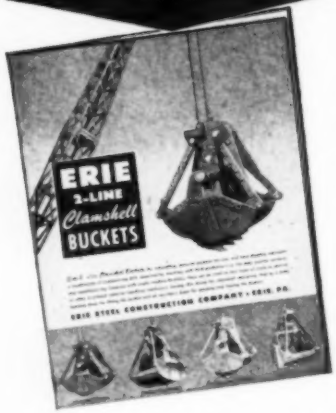

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Steelworks

Continued from page 51

A ⅝-yd. Ruston-Bucyrus 19-RB dragshovel is used to excavate around the piles. To avoid damage, a certain amount of hand excavation close to the piles is also necessary.

Cofferdam excavation—200x20 feet—has been done by a ¾-yd. Ruston-Bucyrus 10-RB and a ⅝-yd. 19-RB, both draglines, down to the level of the first frame to maintain speed, and from that point to foundation level by clamshell buckets swung from stationary cranes which have sufficient reach to cover the whole dam. In the construction of the main pumphouse cofferdam, the melting-shop furnace foundations and mill foundations, 7- to 15-ton Butters and Morgan steam derricks are used; in the cofferdams for the scale pits, crop hoist sump, etc., contractors are using 2½ and 3-ton Booth, Stothart and Pitt, and Smith steam railway cranes.

Large scale production and distribution of concrete is made possible by a quarry owned by the Steel Co. about six miles away, abundant sand close at hand, grit from the adjoining Bristol Channel, and a plant set up on the site. Rex Pumpcrete and Blaw-Knox pumps are used whenever possible, and a Link-Belt Speeder crane with an 87-ft. jib is used for concreting difficult spots where long reach is essential.

The site concrete plant consists of four Benford Regulus mixers arranged in three central mixing units. Two contain one mixer feeding either to a Pumpcrete concrete pump or to a truck-feeding hopper; the third has two mixers feeding to a hopper and a 6-in. Pumpcrete pump. Rex mixers feed concrete for the pump, and for localized work where special mixes are required, as in culvert walls and fireproof concrete.

Twelve-in. diameter porous concrete pipes have been passed through the concrete blocks of the mill foundations. The pipes will act as heat dissipators and be able to absorb the vibration of a heavy steel mill in operation. As each block sets, a cage of reinforcement is inserted and concreted solid. So far about 100,000 cu. yd. of reinforced concrete in foundations, drains and service tunnels (excluding piles) have been used. When the job is completed, this figure will be 260,000.

Because of the lumber shortage in Britain, steel forming is widely used. A large welding plant on the site fabricates most of the steel forms and setting frames for the thousands of holding down bolts set in concrete which will have to carry the heavy machinery. The largest bolts are six inches in diameter and 16 ft. 9 in. long, weighing 1,800 pounds each. Others vary from ½-in. in diameter.

Great accuracy is necessary in setting bolts—a tolerance of only 1/16th inch is permitted. Adjustable templates are used for these bolts, which are trued up when in position. Frames are concreted in. Travelling carriage forms were constructed for the reinforced concrete culverts and tunnels. Standard size panels are built into larger units, some of the bigger steel forms weighing several tons.

No less than 6,500 tons of steel for reinforcement, out of 17,200 tons have been used. Immersion, pan and shutter vibrators are used at the discretion of the engineering consultants.

Eight compressors of Ingersoll-Rand, Holman and Broomwade manufacture provide air for cutting down pile heads, blowing out shutters before concreting, blowing out concrete pumps and operating McKiernan-Terry piling hammers and sump pumps.

Miles of Tunnels

Tunnels and culverts weave through miles of the site. Cable tunnels for water and electrical services already total 4,000 feet, and will eventually cover 7,800 feet. Culverts 6x6x7 ft. at the outfall section already stretch some 9,000 feet, will ultimately reach 10,400 feet. Thirteen thousand feet of culverts for deep drainage and cooling water to be run off to the pumphouse are nearing completion.

A 22-ton 0-6-0 steam locomotive and two Ruston and Hornsby 2-0-4-0 diesel locomotives use 21,000 yards of railroad track and marshalling yards on the site. The tracks are constantly being extended and will be three times their present length when the contract is completed. Several cranes do the materials handling and track laying—a 7-ton Smith and three 5-ton Stothart and Pitts, all steam rail cranes, and four 7-ton Lorains, a 6-ton Smith and a 3-ton Allens.

For the maintenance of this large amount of varied equipment at work on the project, a workshop has been erected equipped with lathes, drilling machines, screw-cutting plant and welding gear. All but the largest repair jobs can be taken care of on the spot.

Work of a different nature forms the major part of the contract held by McAlpine—that of reconstructing the existing Margam steelworks. The contract stipulated that the contractors interfere as little as possible with the day-to-day work of the plant. The job required a high degree of skill as well as cooperation with plant engineers to allow the complex alterations to be made while steel production continued at its record-breaking level.

Reorganization of the railroad system and the building of transporters, inspection pits and bridges formed a large portion of the contract. Although excavation was minor, the confined working space on the McAlpine contract has often meant that machinery could not be used, and much hand excavation has been necessary. However, over a million cu. yd. have been excavated to date by Ruston-Bucyrus and Rapier excavators and draglines.

Foundation work, particularly for the new blast furnaces, has required over 50,000 cu. yd. of concrete. The principal uses for the concrete have been in the construction of circular foundations in the furnaces with a diameter of 86 feet to a depth of 17 feet, designed to carry a load of 14,000 tons; and for a culvert 1,300 feet long to divert the River Ffrwdwyllt under the steelworks into the sea.

5,000 Employed on Job

Various building and civil engineering contractors on this steelworks project have over 5,000 workers on the job, including technical staff. Of this number Wimpey has 2,500 building workmen, backed by 300 technicians. Men on the site usually work in groups of 20 to 30, each group under a foreman.

Local labor is used as much as possible to take up the slack in employment in the district, but the contractors had to go farther out to get all the men they need. Some workers are brought from a radius of 40 miles to the plant by a special fleet of coaches. Skilled building workers have been brought from all corners of the British Isles. Workmen live in the converted RAF camp.

First-aid depots have been established at key points over the site, while a fully-equipped central station deals with serious cases. A doctor from the steel plant is always available. Three canteens cater to the workmen, another to the staff. Thousands of hot meals are served daily. All welfare arrangements were made in early stages by the Steel Co. as an integral part of their reconstruction plans.

In charge of the whole scheme is W. F. Cartwright, D. L., general works manager for the Steel Co. He is assisted by Messrs. W. S. Atkins and Partners, London, in civil engineering work, and by Sir Percy Thomas and Son, Cardiff, on architecture.

For Wimpey the agent in charge is A. A. Wright with W. J. Furlonger as his assistant and J. R. Illingworth as technical supervisor. T. G. Irving is in charge for McAlpine while J. C. Cryer acts for Laing.

Brazos

Continued from page 29

Caterpillar elevating graders working with four 8-yd. Euclid end-dumps hauled material from the borrow areas which were 1,500 feet upstream and adjacent to the embankment. This equipment placed 3,000 yd. every 10-hour day. A Caterpillar D-7 cable dozer spread the soil in 8-in. layers for shaping by a Caterpillar 12 motor grader. Tandem discs mounted on an Allis-Chalmers tractor accomplished pulverization and mixing of added

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BUCYRUS ERIE

South Milwaukee, Wisconsin

moisture. Towed by Cat D-8's, two 3-drum Gar Wood sheepsfoot rollers crunched across the embankment until the proper compaction was achieved.

Rush Work on Embankment

Right now Reed is pushing ahead the work on the earthfill embankment—completion is expected by December. Fill is being placed, graded and compacted in much the same manner and with the same kind of equipment that Standard used. Six Super "C" Tournapulls are placing all material on the Reed contract in 6-in. layers with two Cat D-8 pushers helping along the loading operations. Each scraper hauls about 1,000 cu. yd. daily. Haul distances averages 2,000 feet one way.

Once fill is placed, two Caterpillar 12 motor graders shape and grade the embankment, blading a layer about 20 feet wide before scarifying. The 6-in. layer is then pulverized by a 28-in. Rome tandem disc towed by a Cat D-7. It also is used to mix any needed moisture into the soil. To obtain proper compaction, two 3-unit Tampo sheepsfoot rollers—one with a pressure of 750 psi and the other with 580—are being used. Another 2-drum unit Tampo roller pulled by a D-7 is also employed. Each tamping roller makes four passes for each 6-in. layer.

Before the reservoir is completed, 24 miles of railroad, 12 miles of state highways, local roads, pipelines, power and telephone lines will be relocated. Seven cemeteries within the reservoir limits will also be moved.

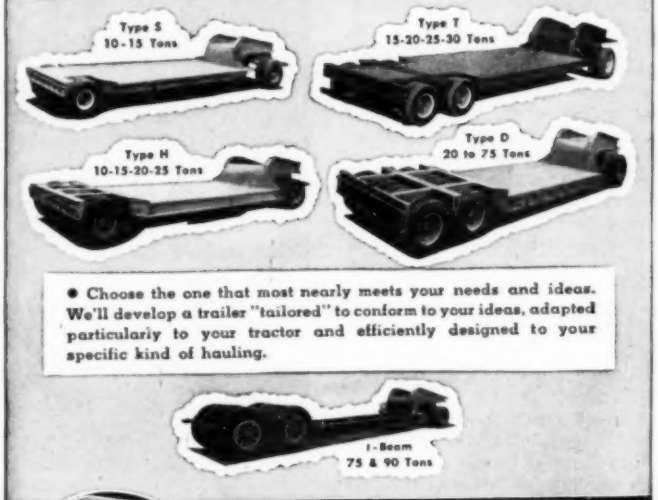
Reed has also been excavating to grade the area selected for the concrete works which will consist of two non-overflow sections, and an overflow spillway section with stilling basin. A power intake section will contain two penstocks, 16 feet in diameter, to carry water to two turbines. The first concrete was poured in March.

Build Cofferdam

In preparation for the concrete work, a first stage cofferdam, projecting into the river channel from the north bank of the Brazos, was built. Construction began in June, 1948, and finished in August.

Foundation rock on which the concrete structures will rest is a nodular limestone known as Comanche Peak

5 BASIC TYPES of ROGERS TRAILERS



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DESIGNERS and BUILDERS of HEAVY DUTY TRAILERS SINCE 1915

136 ORCHARD ST. ALBION, PENNA.

Export Office: 50 Church St., New York 7, N. Y. Cable address: "Broscites"

formation. Three 131JMH Ingersoll-Rand wagon drills put down 1½-in. holes in a 3x5-ft. pattern, drilled in two and three lifts depending on the depth. Air supply came from Ingersoll-Rand portable compressors. Holes were loaded with Hercules powder (1¼x8-in.), the charge varying with the rock and depth of the hole. An average of 800 tons was broken up with each blast, the powder ratio one pound per cu. yd.

A 3-yd. Marion M-93 dragline loaded the blasted rock to two 16-yd. LeTourneau wagons which hauled it to waste areas and cofferdam slopes.

Near the damsite a completely automatic Johnson mixing plant—capacity, 240 cu. yd. per hour—was erected for aggregate mixing. The plant consists of four 2-yd. Koehring tilting type mixers, capable of mixing 1,500 cu. yd. of concrete every eight hours.

Ship Aggregate by Rail

Aggregate is shipped to the site by rail from Carbon, Tex. (The M.K.T. Railroad, under contract with the government built a spur from its main line to the construction site.) After all coarse aggregate is washed a system of conveyors moves it from the railroad siding to stockpiles for 3- to 6-, 1½- to 3-, ¾- to 1½-, and ¼- to ¾-in. material. Adjacent to the mixing plant stands the silo which holds about 2,500 barrels of cement.

Concrete specifications require concrete to be deposited in the forms at a temperature not in excess of 75° F. In order to meet this requirement the contractor has erected a Vogt refrigeration plant with facilities for producing 100 tons of batch chip ice every day. The ice and refrigerated water are added to the concrete in varying amounts to obtain the desired temperature. It is estimated that during the hottest summer weather up to 125 pounds of ice will be added to each cu. yd. of concrete. Water is obtained from a 1,000-ft. well.

Concrete is transported to the forms on LeTourneau wagons, each carrying two 4-yd. Blaw-Knox buckets. Two American revolving cranes on superstructures pick up the buckets and deposit the concrete in the forms. Both cranes have a reach of 125 feet. One- and two-man Chicago Pneumatic vibrators are used to consolidate the concrete as it is deposited.

During the summer the contractor will place concrete in two 8-hr. shifts beginning at 4 PM to utilize the coolest hours of the day. Approximately 800 to 1,000 cu. yd. of concrete are being placed daily.

The power plant will be an independent structure located on the right bank of the river adjacent to the spillway and immediately downstream from the power intake section. Two vertical shaft type, 15,000-kw generators with control, switching, transferring and operating equipment will be housed in the power plant.

Project Personnel

Project construction is under the supervision of the Galveston District of the Corps of Engineers, headed by Col. B. L. Robinson. Col. Robinson estimates that the project will be complete by 1952. Resident engineer for the Corps is Mark Haima; Lee Wilson is his assistant.

The project is under the direct supervision of L. P. Reed, president and owner of the contracting firm. His concrete superintendent is Simon Piedmont. Glen K. Jones is in charge of all excavation and earthmoving projects.

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New trade literature

Title: **Diesel Booklet**

Subject: Various models of diesel engines and auxiliary units are described in a 2-color, 16-page booklet. It discusses applications, fuel requirements, installation and operation details as well as specifications of different sizes of engines.

Where To Get: R. H. Sheppard Co., Inc., Hanover, Pa. (Free)

Title: **Earthmoving Information**

Subject: A 16-page booklet is illustrated with applications and job studies of bulldozers, scrapers, wagons, motor graders and allied equipment. It shows adaptation of equipment at levee construction, railway maintenance, backfilling, land clearing, highway and dam construction stripping and quarry work, and allied jobs. A full-color movie, "Better Blading" is also available. It shows the engineering and manufacturing processes of three motor graders.

Where To Get: Caterpillar Tractor Co., Peoria 8, Ill. If you want the booklet, ask for Form 12108. (Free) Copies of the films are available through Caterpillar distributors.

Title: **Concrete Mixer Bulletin**

Subject: Improvements in Kwik-Mix 3½-S non-tilt Dandie concrete mixer are described in a 4-page bulletin. It includes a description of the "V" belt theory as applied to mixing drum rotation and discusses the advantages of other design improvements.

Where To Get: Kwik-Mix Co., Port Washington, Wis. (Free)

Title: **Air Hose Catalog**

Subject: A new catalog section for a line of air hose features "Highflex" brand, a type recently introduced that is claimed to be 50% lighter than conventional air hose of same working pressure. Detailed descriptions of construction as well as specifications are given.

Where To Get: B. F. Goodrich Co., Akron, Ohio. (Free)

Title: **Arc Welder Catalog**

Subject: An 8-page, 2-color catalog contains illustrations, descriptions, dimensions and specifications on 23 arc welders. Various features comprising the machines are individually illustrated and described. Various portable mountings and accessories are included. Also listed is a high frequency stabilizer attachment for use with any standard AC transformer type welder of 500 amp or less.

Where To Get: Hobart Bros. Co., Hobart Square, Troy, Ohio. (Free)

Title: **Concrete Forming Catalog**

Subject: The Uni-Form system of concrete forming is discussed at length in a new 3-color catalog. Cross-section photographs illustrate assembly and alignment on corners, pilasters, closures, battered walls, circular walls and slab forming. Job pictures are also included. The catalog also

FAMOUS EXAMPLES OF **ARMORED CONSTRUCTION**

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gives advantages and material and labor saving details. Owners and users in the various states are listed as an added feature.

Where To Get: Universal Form Clamp Co., 1238-56 N. Kostner Ave., Chicago 51, Ill. (Free)

Title: **Crane Carrier Bulletin**

Subject: Features of a truck-mounted crane are included in a new bulletin. Specifications and lifting capacities are listed in this 2-color folder.

Where To Get: The Byers Machine Co., Sales Department, Ravenna, Ohio, or from local distributors. (Free)

Title: **Aggregate Feeding**

Subject: An informative illustrated booklet, "Feeds and Feeding," discusses recommended practices for the systematic feeding of aggregates in crushing and screening operations. The text is in three parts: feeding of coarse materials, of graded materials, and of mixed materials.

Where To Get: Pioneer Engineering Works, Inc., Minneapolis, Minn., or a Pioneer distributor. (Free)

Title: **Tractor Shovel Broadside**

Subject: "Four Wheel Drive is Here" is the title of literature featuring the new Payloader tractor shovel. This broadside has large illustrations and shows numerous action views. Specifications and design details are given.

Where To Get: The Frank G. Hough Co., 708A Sunnyside Ave., Libertyville, Ill. (Free)

Title: **Hydraulic Oils Folder**

Subject: This folder describes processed hydraulic oils recently developed. Properties of the oils such as oxidation stability, demulsibility, lubricating value, corrosion and rust preventive qualities are listed and explained.

Where To Get: Swan-Finch Oil Corp., RCA Building, West, New York 20, N. Y. (Free)

Title: **Welding Accessories Catalog**

Subject: A 15-page welding accessories catalog covers both oxyacetylene and electric arc accessories, including goggles, hose, sparklighters, gloves, electrode holders, cable, weld cleaning tools, helmets, face shields, and other items. Done in two colors, the 8½x11 catalog is perforated for binder or loose leaf filing and is illustrated with over 50 photographs.

Where To Get: All sales offices of Air Reduction Sales Co., New York, N Y. (Free)

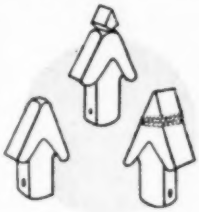
Why Use Old-Fashioned Methods . . . when . . .

MANGANAL

Trade Mark Reg. U. S. Patent Office
11% to 13½% Manganese-Nickel Steel

WEDGE BARS

put your worn equipment back to work . . .



Wedge Bar attached to worn down Shovel & Dipper Teeth

FASTER . . . MORE ECONOMICALLY

Back in the old days worn bucket teeth had to be built-up with electrodes to the shape desired. Now, MANGANAL 11% to 13½% Manganese Steel WEDGE BARS eliminate the need of building-up weld material. They cost less and usually outlast new teeth. MANGANAL workhardens to 550 Brinell. Thrives under severe impact and abrasion. Tensile strength is high — up to 150,000 p.s.i. Available in 22 sizes to fit any tooth size. MANGANAL is the short-cut to true economy.

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Sauerman Slackline Cableway digs gravel from lake and delivers 75 cu. yd. an hour to plant at cost of few cents a yard.

Sauerman Power Scraper operating 3 cu. yd. bucket on a 700-ft haul, digs gravel from deep pit and feeds 60 tons of material per hour into plant.

Dig, Haul, Dump at Lowest Cost with a

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Pit excavation, strip mining and stockpiling are jobs at which Sauerman Scrapers and Cableways excel. This long range equipment is very flexible and is easily adapted to the exact requirements of each particular job, whether working deep under water, in a clay formation, on a hillside, in a swamp, or moving bulk materials into and out of stockpiles.

The first cost of a Sauerman installation is reasonable, maintenance amounts to very little, and the simplicity of operation makes it possible to place the control of even the largest installation in the hands of one operator. Write or wire for Catalog.

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NOT in the *Contract*

The woman was on her way to town when a contractor entered the bus and took the seat ahead of her. She looked at him a moment, then asked "Excuse me, but aren't you the father of one of my children?" The contractor turned white and left the bus at the next stop.

That night she wonderingly told the incident to her husband, who asked, "But didn't you tell him you are a school teacher?"

"I paid $100 for that dog — part collie and part bull."

"Which part is bull?"

"The part about the hundred dollars."

The driver was busily engaged with a hand shovel in the mud beside his truck when a timekeeper hailed him.

"Stuck in the mud?"

"Oh, no," exclaimed the truck driver cheerily, "my motor just died and I'm digging a grave for it."

Passenger: "What's the use of having a time table if the trains on this line never run on time?"

Conductor: "We couldn't tell how late they are without a time table."

Shapely Model: The artist I pose for does painting, etching and sculpturing.

Friend: But, of course, he does one thing better than anything else.

Model: Yes, but he's pretty good at painting, etching, and sculpturing too.

A new Hampshire contractor had been urged to attend the funeral of his neighbor's third wife. "But I'm not goin'," he announced to his own wife.

"Goodness sakes, why not?" she asked.

"Well, Mary, I'm beginnin' to feel kinda awkward about goin' so often without anything of the sort to ask him back to."

"What makes you think I'm *not* in here alone?"

"Sir," hissed the lawyer, "do you swear this is not your signature?"

"Yep."

"Is it not your handwriting?"

"Nope."

"You take your solemn oath that this writing does not resemble yours in a single particular?"

"Yep."

"How can you be certain?" demanded the lawyer.

"Cain't write," smiled the witness.

A newly married doctor was taking his young wife out walking one afternoon when a pretty girl smiled and bowed to him.

Wife (scenting an earlier love affair): "Who's the lady, dear?"

Doctor (nonchalantly): "Oh, just a girl I've met professionally once or twice."

Wife: "No doubt, but who's profession—yours or hers?"

"Yes," said the steamboat captain, "I've been running these boats on this river so long I know where every sandbar is."

Just then the boat hit a snag with such force that it shivered from stem to stern.

"See," said the captain, "there's one of them now!"

Contractor: (dining in a small town hotel): "Why does that dog sit and watch me all the time?"

Waitress: "You've got his plate."

Three small boys were seated on the curb. One was playing with an airplane. One was pushing a toy fire engine. One was reading a copy of *Esquire*. A kindly old man approached and asked them what they wanted to be when they grew up. The first replied that he wanted to be a B-29 pilot. The second said he wanted to be a fireman. The third looked up from the magazine and said, "Aw, I just want to grow up."

Visitor: "What a glorious painting. I wish I could take those lovely colors home with me."

Painter: "You will. You're sitting on my palette."

Mother: "I don't think the man upstairs likes Johnnie to play on his drum."

Father: "What makes you think so?"

Mother: "Well, this afternoon he gave Johnnie a knife and asked him if he knew what was inside the drum."

YOU CAN TELL IT'S A BAKER BY THE LOAD ON THE BLADE

Sure sign of a Baker Bulldozer — a hefty load on the blade — which adds up to more and lower cost yardage per shift. The reason more and more experienced earthmovers are insisting on Baker Bulldozers.

You'll find Baker the answer to your problems too. Simplicity of design and construction — ease and accuracy of control — tremendous down pressure — and the most reliable and dependable hydraulic system in the industry. Facts you can prove to yourself on your own job.

Before you buy any bulldozer — see your friendly Baker - Allis-Chalmers dealer first.

BAKER

They Go Together

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. Please count your copy carefully to avoid delay. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Be sure to enclose the correct amount of money with your order. Closing date — 15 of preceding month. Example: January closes December 15th.

FOR SALE

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

One Bucyrus model 78-C, serial No. 4348, steam powered, crawler mounted shovel with 3-yard cast dipper, also extra dipper, needs boiler work and hoist chain, balance machine good condition. Located Central Texas. Box 3342

Marion 37 steam shovel equipped with 1¾-yard dipper. Overhauled last winter, boiler reflued, steam piping renewed and engine repacked. Box 3343

Bucyrus-Erie 50-B Ward-Leonard horizontal thrust coal loading shovel. Good operating condition. Location Middle West. Box 3341

Northwest 80-D's
Combination Shovel and
Dragline with Buckets

Three to choose from. Guaranteed like brand new. Used but few hours. New cost today, if available, (delivery date, 1951) approx. $55,000. MUST SELL THESE UNITS AT ONCE . . . AS LOW AS $36,600, or will rent with option to buy to responsible party. PHONE NOW! Call George Vonderheide at Sacramento 3-8990 or eves. at 5-6922.

National Tractor Co.
401 Broadway Sacramento, Calif.
Phone 3-8990

Bucyrus-Erie 44-B shovel (2-yd.) equipped with Buda engine. Complete stock spare parts to be sold with machine. Located South America, but will disassemble and load to steamer for shipment. Box 3338

1—1¼ cu. yd. Osgood crane and backhoe — new General Motors diesel motor.
1—Model 255-A P&H, ¾ yd. dragshovel and clamshell with gas engine. Excellent condition, approximately one year old.
1—Osgood model 200 ½ yd. shovel and crane gasoline engine, eight years old.
1—Osgood model 200 shovel and crane and backhoe with Chrysler engine, approximately three years old.
Backhoe with two buckets available for either above machines.
1—Model 255 P&H ¾ yd. dragshovel, crane, and dragline, approximately 10 years old.

Stuart M. Christhilf & Company, Inc.
134-136 West Mt. Royal Ave. Baltimore 1, Md.

For Sale
Two Bucyrus-Erie 22-B
¾ yd. draglines. 40 ft. booms.
Wayne Foskett Howell, Michigan

NORTHWEST model 6 shovel.
NORTHWEST model 80 shovel.
Located Minnesota. Box 3329

Bucyrus-Erie 50-B steam shovel No. 10208. **Located at Crosby, Minnesota. Box 3328**

Bucyrus-Erie 45-B dragline, shop No. 11480. No buckets. Wisconsin gasoline engine model E-2. Boom 70'0". Machine completely rebuilt including engine. Box 3330

Placer Gold Dredge

8 cu. ft. diesel-electric, Bucyrus-Erie bucket-line dredge and necessary auxiliary equipment for a one dredge operation will be sacrificed at fraction of replacement cost. Dredge is in good mechanical condition; was built new in 1940. Digging depth, 30 ft. below water.
Equipped with two Ingersoll-Rand type S diesel engines, Byron-Jackson pumps, electrical equipment all General Electric. Sectionalized steel pontoon hull. Complete specifications and price on request. Dredge can be inspected in running condition at Sunbeam, Idaho. Address inquiries to Box 3337 care of Excavating Engineer.

2 Super C Tournapulls, Serial C3T 5448 and C3T 5458 with L. P. Carryall scrapers Serial TS 26391 and TS 26514.

Consumers Company
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Bucyrus-Erie 29-T electric blast hole drills arranged for operating on a power supply of 220/440 volts, 3 phase, 60 cycle current. Each drill equipped with a string of drilling tools, drilling line, sand line, bailer, circle jacks and a set of wrenches. Drills are available in the West and are to be reconditioned before sold. Box 3340

Peerless turbine pump and panel. 150 HP—capacity 3000 gpm, 160' head. Used from July 1947 to November 1948. In excellent condition f.o.b. cars Yakima at $1500. New factory price—$4000. Box 436, Yakima, Washington.

SHOVEL FRONT complete for model 70 Buckeye ¾ yd. machine. Perfect condition.
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Telephone: OVerlook 3-86

1—Link Belt ¾ yd. LS-40 crane w/shovel and clamshell attachment also 10' x 20' boom extension, $5500.
4—GMC 6 x 6 dump trucks w/5 yd. Gar Wood bodies. One new, $2500. Three slightly used, $2000.
1—30 to 40 ton low bed tractor and trailer new, $4000.

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New Diesel Engines

2—Caterpillar D-8800 diesel engine, 4 cylinder 5¼" x 8" with accessories.
1—Buda Lanova 4-DT-226 diesel engine 4 cylinder 3¾" x 5⅛" with accessories.

Being Offered at Bargain Prices
Bucyrus-Erie Company South Milwaukee, Wis.

Two AX 7-yd. Bucyrus-Monighan Red Arch dragline buckets with teeth and chains. A-1 condition.

Atlas Coal Company, Inc.
Oskaloosa, Iowa

WANTED

Bucket users who are interested in saving 50% on repair parts. We have new parts for all size Hendrix draglines and drag chains and parts for 1½ and 2-yard Page buckets — also pins, bushings, etc. for ½-yard Owen clamshells.

All Offered at 50% Off.

Send For Complete List.

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EXCAVATING ENGINEER
Box 3318

One Lorain 40 cable crowd shovel front complete with boom, stick and ⅝ cubic yard bucket. Priced right for quick sale. Box 3321

1—Bucyrus-Erie AXY Red Arch, 8 cu. yd. dragline bucket together with 103 parts and accessories. Mid-western location. Slightly used. Box 3335

Used Equipment For Sale

Lorain 41 ¾-yard shovel-dragline Caterpillar engine. Approximately two years old. Good condition.
Buckeye 70 ¾-yard backhoe. Excellent condition. Will sacrifice.
TD-14 IHC tractor with Bucyrus-Erie hydraulic Bullgrader. Fair shape. Will sell cheap as is.
HD-14C Allis-Chalmers tractor with Gar Wood angle blade and cable control unit. Overhauled and in excellent condition.
Telsmith portable crushing plant, 18 x 32 jaw, 28" cone.

E. F. Craven Company
Box 538 Greensboro, N. C. Phone 3-5521

Bucyrus-Erie 22-T gasoline powered blast hole drill Shop No. 47465 with drill tools and trailer for drill. Franklin & Palmer, 127 Montgomery Street (Room 402), San Francisco, California.

For Sale
Coal Mine Now In Operation
One 3-W Bucyrus-Monighan walker dragline, diesel electric.
One E-2 Bucyrus crane dragline, diesel.
One 36-B Bucyrus crane dragline, diesel.
One T20 International tractor.
Three compressors.
400 amp. Westinghouse electric welder.
Acetylene welding outfit.
One 6 x 6 army truck.
One 1939 Ford V8 1-ton pickup.
One Fairbanks-Morse 10-ton scale.
Buildings, powder house, all tools, 5-drag-buckets, 60 acres coal land. Home in town. Box 3339

Dragline front end for Bucyrus-Erie 120-B (Machine No. 12016). Includes 100' boom, fairleads, drum, pedestal, bands, etc., and 4-yd. Page bucket. Box 3320

Bucyrus-Erie No. 8 bit dresser. Complete and in perfect operating condition. Located in Washington State. Box 3271

Bucyrus-Erie 29-T diesel drill, No. 21264, caterpillar type mounting Caterpillar diesel engine. Recently overhauled. Ready for immediate shipment. John Pitcher, 7108 Mission Street, Daly City, California.

Continued on page 64

"CLOSE-IN" DIGGING with a BUCYRUS ERIE HYDROCRANE

THE completely hydraulic Hydrocrane gets in close on excavating jobs where the big clams won't fit. Telephone wires, buildings, walls, fences, low ceilings won't stop the easy-to-handle Hydrocrane. Precision hydraulic control and telescoping boom make it easy to use on the "close-in" work. It is truck mounted, travels at truck speeds and has proved very economical on small-yardage jobs where a larger machine is impractical.

Hydrocrane owners also report doing hundreds of other excavating jobs such as:

- Small swimming pool
- Septic tanks
- Catch basins
- Column footings
- Telephone manholes
- Basement enlargement
- Small foundations
- Gasoline and fuel tanks
- Sump holes for irrigation
- Shallow wells
- Water lines
- Trenches

In addition to a clamshell bucket, you can use it with a magnet, grapple, catch basin bucket, trash or snow bucket. Two models — ¼-yd. 2-ton H-2 and ⅜-yd. 3-ton H-3. For the complete story on the Hydrocrane just fill out the coupon. 48H49C

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SOUTH MILWAUKEE, WIS.

See what these owners say.

SEWER WORK AND HOUSE CONNECTIONS, DIGGING DEEP HOLES, GENERAL EXCAVATING

"I like the Hydrocrane because it's easy to handle, fast to move, very efficient in real tight quarters — especially working below overhead wires and beams and also between buildings. It's handy between sidewalks and curbs for sewer work."

ALBERT J. VALENTINO
D-V Construction Company
West Allis, Wisconsin

EXCAVATING AND SINKING OIL TANKS

"We worked inside of a factory building. The head room was so low I had to work with a flat boom except when loading truck. The telescopic boom made it possible to reach everything without moving. If not for the H-2, they would have had to have eight men working two full days. I did it in thirteen hours."

THOMAS M. CASEY
Bucheron, Michigan

FOR ALL TYPES OF EXCAVATING JOBS

"I've done work with my Hydrocrane that other machines couldn't get close enough to do. I've done almost every type job that calls for that type machine — from digging graves to hoisting steel beams."

BILL JOHNVIN
Mountain, Michigan

MAIL THIS COUPON TODAY

BUCYRUS-ERIE HYDROCRANE DIVISION
SOUTH MILWAUKEE, WIS.

I want the full story on the Hydrocrane

NAME.....

COMPANY.....

ADDRESS.....

CITY..... STATE.....

For Sale

Continued from page 62

MECHANICS — HOME STUDY. Step up your own skill with facts and figures of your trade. Audels Mechanics Guides contain Practical Inside Trade Information in handy form. Fully illustrated. Easy to Understand. Highly endorsed. Check book you want for 7 days' Free Examination. Send no money. Nothing to pay postman. ☐ Carpentry $6, ☐ Auto $4, ☐ Oil Burners $1, ☐ Sheet Metal $1, ☐ Welding $1, ☐ Refrigeration $4, ☐ Plumbing $6, ☐ Masonry $6, ☐ Painting $2, ☐ Radio $4, ☐ Electricity $4, ☐ Mathematics $2, ☐ Steam Engineers $4, ☐ Machinist $4, ☐ Blueprint $2, ☐ Diesel $2, ☐ Drawing $2. If satisfied you pay only $1 a month until price is paid.

AUDEL Publishers
49 W. 23 St. New York 10, N. Y.

New Dragline Buckets

2—1¼ cubic yard Red Arch Type AX medium duty buckets.
2¼ cubic yard Red Arch, Type AX medium duty bucket.
2½ cubic yard Type AX dragline bucket. (Reconditioned.)
3 cubic yard Red Arch, Type AY heavy duty bucket.
5 cubic yard Red Arch, Type AY heavy duty bucket.
6 cubic yard Red Arch, Type AY heavy duty bucket.

Bucyrus-Erie Company
Parts Division
South Milwaukee, Wisconsin

WANTED

Wanted: Complete chain crowd shovel front end equipment for Bucyrus-Erie 32-B dragline.
Box 3319

HELP WANTED

Repair Foremen

Large mining firm in Chile (South America) requires two or three competent foremen to take complete charge of maintenance and training work. Duties will include supervising repair and maintenance of shovels (diesel and electric, up to 3½ cu. yds.) bulldozers, tractor shovels, air compressors, etc., and also training of local operators and mechanics. A working knowledge of Spanish is important. Must be single men. Please write giving age, and past experience. Box 3334

POSITION WANTED

Gen. supt. or supt. available. Experience covers 25 year supervising, estimating and building all classes of excavating; railroads; highways; airports; earth-fill dams; large sewers. Honest, sober, reliable. Best of references. Salary open. Box 3336

Can This Man Help You?
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1. Thirteen years quarrying, crushed stone and building block manufacturing experience.
2. Now contacting quarries, stone, sand and gravel, slag, cement and building block plants and similar industrials throughout eastern Pennsylvania for a heavy equipment dealer.
3. Some other sales experience.
4. Good character references.
5. Familiarity with the central eastern Pennsylvania territory, being a resident there for years.
6. College graduate—degree in chemistry.

What He Wants

A permanent sales representative connection in the eastern Pennsylvania and adjacent areas territory with a well-established, reputable organization, one known for its efficiency of operation, cooperation with its field men and low personnel turnover, such as

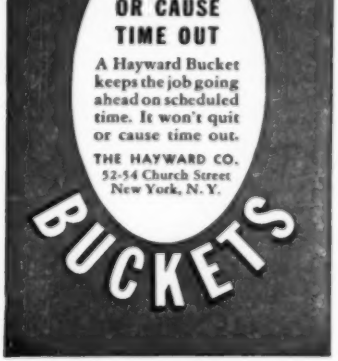
1. A manufacturer of or dealer in power shovels, crushing, screening, conveying, building block manufacturing or other closely allied lines of equipment or supplies used in quarries, stone, sand and gravel, slag, cement and building block plants or similar industrials; OR
2. A cement manufacturer or large manufacturer of lime, stone products, sand and gravel, slag or other products of similar nature.

For further information write Box 3344, Excavating Engineer.

Position wanted as shovel operator. Can operate any make of machine; shovel; dragline; clamshell, or crane. Steam, gas, diesel or electric. Large or small machines. Box 3312

Notes from the manufacturers

Dow and Co., Inc., Buffalo, N. Y. distributor of heavy equipment in western New York has announced the election of John D. Eddy as vice-president and sales manager. Eddy has been associated with Dow for 10 years in various sales capacities and has had 15 years previous selling experience in associated lines.


HAYWARD
WON'T QUIT
OR CAUSE
TIME OUT
A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.
THE HAYWARD CO.
52-54 Church Street
New York, N. Y.
BUCKETS

Roy D. Smith of the Wm. H. Ziegler Co., Minneapolis, Minn., died on April 15. He held many positions with the Ziegler firm, his last that of floor salesman in the main office at Minneapolis. He had been with Ziegler for 25 years.

Air Reduction Sales Co., New York, N. Y. has announced a new oxygen and acetylene cylinder leasing plan designed for the small volume user. A 122-ft. capacity oxygen cylinder and a 60-ft. acetylene cylinder are offered on lease for a 25-year period at fifty dollars a pair. This period is the estimated life of the cylinders. Lease includes ordinary wear and tear repairs, periodic retesting and inspection without extra cost. When cylinders are empty, they may be exchanged for a full pair.

Union Wire Rope Corp., Kansas City, Mo., has assigned Randy Vories as field representative in Michigan, northern Illinois, and northern Indiana. He will have offices at Lansing, Mich.

American Iron and Steel Institute, 350 Fifth Ave., New York, N. Y., presented the Gary Memorial Medal for outstanding achievement in the iron and steel industry to Benjamin F. Fairless, president of the United States Steel Corp. and vice-president of the Institute. It was the first time since 1944 that this top honor in the steel industry has been awarded.

R. G. LeTourneau, Inc., Peoria, Ill., recently certified the 10,000th operator of construction equipment. Joe Brady, Danville, Ill., received his certified operator number, P&TP-10,000 from R. G. LeTourneau, president of the firm. Operators must accumulate 1,000 hours or more of verified operating experience and must be recommended by their contractor-employers to qualify.

DREDGES

HYDRAULIC
DIPPER
CLAMSHELL

Bolted sectional steel hulls for landlocked, inland waters

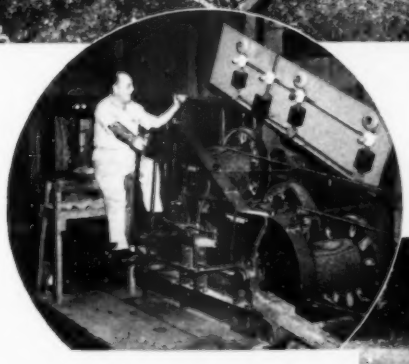
If you need a dredge, write us!

AMERICAN STEEL DREDGE CO. INC.
FORT WAYNE 1 · INDIANA · U.S.A.

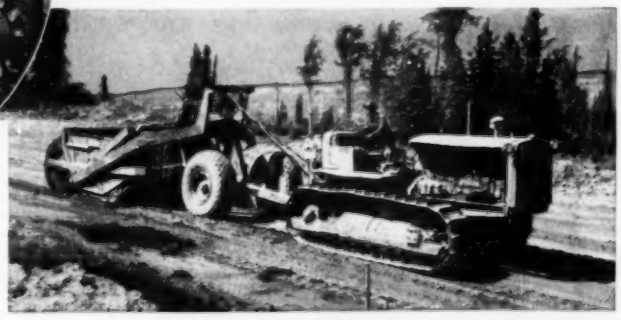
DESIGNERS AND BUILDERS OF DREDGING EQUIPMENT SINCE 1905

Improved Performance with LAY-SET PREFORMED

In strip mining costs are figured on a "per-ton" basis. The faster the overburden is handled and the coal or minerals speeded to market, the more profit "per-ton." Dependable wire rope helps lower costs because there are fewer shut-downs. LAY-SET Preformed's *improved performance* makes it dependable . . . and a favorite wire rope of strip operators everywhere.



Hoists on construction jobs require safe, dependable wire rope because a single line is used to lift materials—and men. Here's a job for LAY-SET Preformed, the Green Strand Wire Rope with improved plow steel wires. It has great strength and flexibility. It means *improved performance.*



Building roads and dams is another use of wire rope where LAY-SET Preformed gives *improved performance.* Hazard's Streamlined Scraper Cable was designed for this tough service. It stands shock loads and lasts longer bending around small sheaves.

For every wire rope use *— in mining, industrial, contracting— there are HAZARD Wire Ropes that will improve performance. And there is a HAZARD distributor near you who can supply your needs. Call him today for full information.*

ACCO
In Business for Your Safety

LAY-SET Preformed GREEN STRAND WIRE ROPE

HAZARD WIRE ROPE
A DIVISION OF AMERICAN CHAIN & CABLE

TRADE MARK

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Seattle, Tacoma, Bridgeport, Conn.

IT ADDS UP

Versatility (6 machines in one)
Mobility (fast between jobs)
Productivity (capacity: 60 yds./hr.—5-ton crane)

MORE PROFIT ON SMALL JOBS

Model M-49

The Schield BANTAM is a versatile time-saving money-maker on a wide variety of jobs. Use it as a shovel, trench hoe, dragline, clam, piledriver or 5-ton crane. Interchangeable booms and buckets are installed in minutes. Split type laggings permit proper line speeds and assure high performance on all operations. *Independent boom hoist* allows boom to be powered up or down, or lowered on brake for fast operations. The BANTAM mounts on any 1½-ton truck chassis or larger for maximum mobility. Drives up to the job and digs in. When it finishes one job it rolls on to the next without delays. No costly loading and blocking expense.

Designed for steady going at a profit-making pace, the BANTAM has a capacity of 60 yards per hour when used as shovel or dragline. As a trench hoe it will dig 100 feet of 5 foot ditch per hour. Built tough where wear is heaviest, rugged where strength is needed. Jack, drum, and swing shaft assemblies are mounted on Timken tapered roller bearings. Drums, swing gears, and vertical swing shaft roll on sealed-for-life ball bearings. All gears and pinions are machine cut. Smooth operating mechanical "snap-in" clutches reduce operator fatigue. Turntable base design protects bull gear from dirt and grit, and modern hook rollers cut maintenance costs by minimizing strain on center pin and wear on turntable roller bushings.

Get complete facts on the BANTAM. Find out how its design and operating features can make small jobs pay bigger profits. Write for new literature now.

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THE SCHIELD BANTAM CO., INC.
202 PARK STREET • WAVERLY, IOWA

THE 1/3 YARD SCHIELD BANTAM

TRUCK MOUNTED SHOVEL • TRENCH HOE • DRAGLINE • CLAM • PILEDRIVER • CRANE